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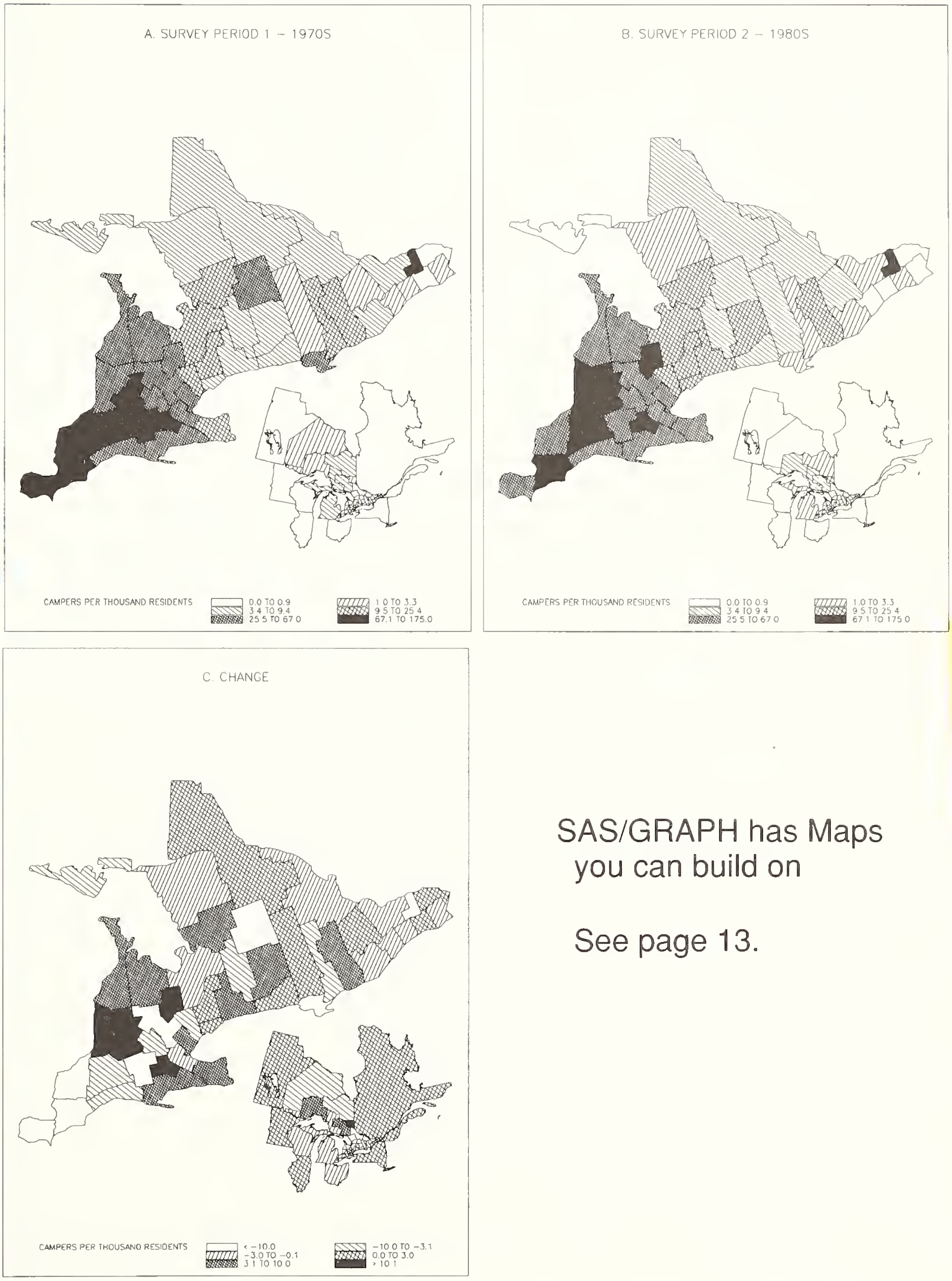
CHANGE IN THE ORIGINS OF CAMPERS PER THOUSAND RESIDENTS VISITING ALL PROVINCIAL PARKS IN SOUTHWESTERN ONTARIO



A. SURVEY PERIOD 1 – 1970S

B. SURVEY PERIOD 2 – 1980S

C. CHANGE

NOTE: COMPILED ON SAS/GRAPH. DATA FROM MINISTRY OF NATURAL RESOURCES

SAS/GRAPH has Maps
you can build on

See page 13.

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VMBATCH Service Available on VM/CMS

Bill Fehlner
FEHLNER at UTORONTO

UTCS introduced VMBATCH, a new facility for the VM/CMS service, on May 13, 1988. The VMBATCH system adds another method for using application programs within CMS. By sending time-consuming tasks to the VMBATCH system, you can free your own Userid for interactive work. You can also perform several unattended tasks at once, because VMBATCH can process your jobs as soon as the needed resources become available. This article provides an introduction to VMBATCH, some examples of how to use the facility, and a list of Help files and other online documentation.

Introduction

With VMBATCH, the VM system can simulate the GPJS Batch environment familiar to MVS users, while still offering the advantages of the interactive VM environment. VMBATCH does this by using special Virtual Machines known as worker machines. The typical unit of work in the VMBATCH system is a job. A job consists of all the EXECs, programs, and data necessary to complete a data-processing task. When you submit a job to VMBATCH, the job is sent to a worker machine for execution. After the job is finished, the results are returned to you in your Reader. VMBATCH can also send results to a printer or a tape drive.

A general user can use the VMBATCH user subcommands to submit, query, reorder, and cancel jobs. You can tailor job options to your own needs or rely on default job options provided by VMBATCH. Jobs sent to VMBATCH can execute as soon as the needed resources become available, or when certain site-specified conditions are met. VMBATCH sends you a message when your job is initiated and when it is completed. After completing your job, VMBATCH sends all completed or changed files to your Reader as spool files. You can use the RDRLIST (RL) command to access these spool files.

General Considerations

To use the VMBATCH system for a new application, you must make some general preparations. The key concept is that a worker machine does all those things that you would do in the foreground with CMS commands in order to complete the assigned task. Thus, you must provide the worker machine with all the information that would be available to your own session if you were doing the work interactively.

The first step is to review your PROFILE EXEC. Many users have one or more GETME commands in PROFILE EXEC. Since the worker machine does not use your PROFILE EXEC, these GETME commands must be given explicitly. Some other items that may be "hidden" in your PROFILE EXEC are GLOBAL commands used with FORTRAN programming, FILEDEFs, TEMPDISK commands, or commands linking and accessing other minidisks. You must decide which of these, if any, are needed for the specific job being sent to VMBATCH.

The second step is to write a short EXEC file that has all the commands you identified as necessary in Step 1 (see the next article,"An Introduction to REXX," for information on writing EXEC files). This EXEC file also contains all the commands that you would submit to CMS directly in order to accomplish your job. Because the worker machine runs unattended, these commands must all be in a noninteractive form. For example, a COPY command cannot be done from the Filelist panel. Instead, it must be entered in full, as you would from the Command line. Similarly, if you are mounting a tape, you must use the full form of the MOUNT command, not the interactive form.

The third step is to identify which files on your A disk are required by the job. These might be a source file, a data file, or a SAS data set. The worker machine has its own A disk, and you normally send all the necessary files to that A disk as part of the job submission to VMBATCH. An alternative method is illustrated in Example 3 below.

The fourth step is to use the VMBATCH system to submit your job and monitor its progress. This is described in more detail below. VMBATCH has an interactive facility with several menus and an extensive Help system to assist you in this process.

Finally, you use the Readerlist (RL) to peek at and/or receive the files created or modified when your job ran. These files include a console log of the worker machine session, which can be very useful in debugging your EXEC file.

Using VMBATCH

VMBATCH can be used in an interactive or noninteractive mode. The Help files accessed with the HELP VMBATCH command are oriented to the noninteractive approach. The interactive VMBATCH facility has Help files built in. Help is available from any menu with the PF1 key.

To begin using VMBATCH, assemble the information described in Steps 1 through 3 in the previous section. Start with a small, simple job until you are comfortable with the system. Start the VMBATCH facility with the CMS command: VMBATCH. The first menu is configured for a novice user. There are three levels of user interface — novice, fluent, and expert. The novice level displays screens with a limited number of options, but with onscreen descriptions of each option. The first novice menu has six options. Select OVERVIEW for a short review of VMBATCH. Then select SUBMIT to begin the process of job submission.

On the first SUBMIT menu, you name the EXEC file containing your job. You also indicate whether any other files are to be placed on the worker A disk and used with this job. If you do indicate other files, another menu appears on which you may list the file names. After this menu (or directly from the first SUBMIT menu) a third menu appears, which allows you to choose a job name for your job. The system will provide a unique job name if you have no preference. When you exit this final SUBMIT menu, the job is submitted to VMBATCH.

This is much more complicated to describe than to do. Perhaps the best way to test drive VMBATCH is to log on to CMS and follow through one of the examples shown below.

PF key assignments are displayed at the bottom of each menu in VMBATCH. <PF4> will exit VMBATCH from any point at any time. <PF12> submits the current job if subsequent menus are not needed. For example, if you find the default job names satisfactory, you can skip the remaining menus and submit the job immediately. <PF3> exits to the preceding menu in the usual CMS manner.

Example 1: a self-contained SAS program

In this example, a single SAS program is run. All the data is included in the program, and only a report is produced. The EXEC file is called EXAMPLE1 EXEC A and contains:

```
/* example one */
'GETME  SAS'
'SAS  PROG1'
```

Note that the EXEC file begins with a title in the form of a comment and all the other lines are enclosed in single quotes.

The actual program is called PROG1 SAS A and contains:

```
DATA  SAMPLES;
 INPUT  A  B  C;
 CARDS;
3.1  1  1
  .
  .
11.1 4  3
 ;
PROC  REG  DATA=SAMPLES;
 MODEL  A = B  C;
RUN;
```

Both the EXEC file and the program source file are sent to VMBATCH. This can be done through the menus, as described above. Alternatively, you can use the CMS command:

```
vmbatch submit example1 exec a prog1 sas a
```

In either case, the job is submitted. Messages are sent to your interactive CMS session when the job starts, when it completes, and when the output files are returned to your Reader.

This job sends three files to your Reader. JOB0469 J0469CON is the console log from the worker machine. It is a record of what would have appeared on your terminal if you had run the job interactively. PROG1 SASLOG and PROG1 LISTING are the log and listing files from the SAS program itself.

Example 2: a SAS program accessing files

In this example, a SAS program processes raw data contained on a separate minidisk and creates a SAS data set in a permanent SAS library. The EXEC file is called EXAMPLE2 EXEC A and contains:

```
/* example two */
'LINK userid  295  295  RR'
'ACC  295  C'
'GETME  SAS'
'FILEDEF  RAW  DISK  RAW2  DATA  C'
'FILEDEF  SASLIB2  DISK  DUMMY  SASLIB2  A'
'SAS  PROG2'
```

The EXEC file begins with a comment line. The LINK and ACC commands allow the worker machine access to your 295 disk in read-only mode. This avoids the dangerous practice of allowing a worker machine write access to your minidisks. Note that your 295 minidisk must have a read password of ALL if the link command is to work.

The actual SAS program is called PROG2 SAS A and contains:

```
   DATA  SASLIB2  INFOR2;
    INFILE  RAW;
    INPUT  A  1-5  B  7-15  C  25-30  D  70-75;
 RUN;
```

Both the EXEC file and the program source file are sent to VMBATCH. This can be done through the menus, as described above. Alternatively, you can use the CMS command:

```
vmbatch submit example2 exec a prog2 sas a
```

In either case, the job is submitted; it sends three files to your Reader. JOB0475 J0475CON is the console log from the worker machine. PROG2 SASLOG is the SAS log, and INFOR2 SASLIB2 is the SAS data set created by the data step in the program.

Example 3: a FORTRAN compile, load, and run

In this example, a FORTRAN program is compiled and loaded. The source program and input data are both files on your A disk. A VMBATCH worker machine

MVS Warning!

MVS will no longer
be available from UTCS
after

JUNE 30, 1988

The following services will be affected

I.P. Sharp APL
Batch (including CLASS E)
TSO
WYLBUR

If you are currently using any of these services please contact the UTCS staff listed below for assistance in conversion to our VM/CMS service.

Statistical & Numerical Applications
Bill Fehlner 978-6509

Text & Imaging Applications
John Bradley 978-3995

Commercial & Affiliated Customers
Ihor Prociuk 978-6875

accesses your A (191) disk as its B disk in read-only mode. This permits you to read data files from your A disk without sending them explicitly with the VMBATCH facility.

The EXEC file is called EXAMPLE3 EXEC A and contains:

```
/* example three */
‘GETME   FORTRAN’
‘FORTVS   PROGF3’
‘GLOBAL   TXTLIB   VFORTLIB   CMSLIB’
‘GLOBAL   LOADLIB   VFLODLIB’
‘LOAD   PROGF3’
‘FILEDEF   5   DISK   RAW3   DATA   B’
‘FILEDEF   6   DISK   EXAMPLE3   OUTPUT   A’
‘START *’
```

Note that two FILEDEF statements are used after the LOAD command to connect the FORTRAN Units 5 and 6 to the appropriate input and output files. As mentioned above, input is from a file on your A disk, which is accessed as the worker machine's B disk. Output written to a file on the worker's A disk is sent to your Reader at the end of the job.

The FORTRAN source code is in PROGF3 FORTRAN A and contains:

```
             PROGRAM EX3
C this program used with example 3
             REAL B
             INTEGER I,IA,IMAX
              PARAMETER (IMAX=100)
             DO 100 I = 1, IMAX
             READ (5,1000,END=200) IA,B
     1000  FORMAT(I5,1X,F9.4)
             WRITE (6,2000) I,IA,B
     2000  FORMAT(‘ ‘,’Record ‘,I3,’ has values’,I5,3X,F9.4)
     100   CONTINUE
     200  CONTINUE
             STOP
             END
```

Both the EXEC file and the program source file are sent to VMBATCH. This can be done through the menus, as described above. Alternatively, you can use the CMS command:

```
vmbatch submit example3 exec a progf3 fortran a
```

In either case, the job is submitted; it sends five files to your Reader. JOB0493 J0493CON is the console log from the worker machine. EXAMPLE3 LISTING and EXAMPLE3 TEXT are the compiler listing and the object code respectively from the compile step. LOAD MAP is the loader map from the LOAD step. EXAMPLE3 OUTPUT is the material written to Unit 6 by the program when it ran.

Documentation

There are five sources of information on the VMBATCH system. The interactive facility for submitting VMBATCH jobs has online Help built in. This is available by using the PF1 key at any time within the VMBATCH facility.

VMBATCH can also be accessed with a set of noninteractive CMS commands. Use the HELP VMBATCH command to access online Help for the noninteractive method of job submission.

This article is stored as VMBATINT LISTING in the TECHNOTE facility on CMS. Use the CMS command TECHNOTE to access this facility, and then browse or print the VMBATINT file.

The 92-page *VMBATCH User's Guide* is stored as VMBATCH LISTING in the DOCUMENT facility on CMS. The 158-page manual *VMBATCH Messages and Codes* is stored as VMBATMC LISTING in the DOCUMENT facility. The former may be helpful in getting an overview of VMBATCH and in learning its advanced features, such as setting defaults. The latter is useful primarily in debugging VMBATCH jobs.

An introduction to REXX

Ted Sikorski
SIKORSKI at UTORONTO

This article is intended as a brief introduction to the Restructured EXtended eXecutor language (REXX) and how it can be used to control Batch jobs. More information about submitting Batch jobs can be found in the preceding article.

The REXX EXEC

REXX is an extremely versatile programming language available on UTCS' VM/CMS system. REXX programs are *interpreted*. That means the program interperter operates directly on the program as it executes; you do not have to compile REXX programs and then run them. (By convention, programs written in REXX are called EXECs; that term will be used throughout this article.)

Let's start off with a simple example. When you are learning a new programming language, typically you write a program that says "HELLO WORLD"; we will be no different. Here it is.

```
HELLO EXEC

      /*  An EXEC to say HELLO */
               say "HELLO WORLD"
```

If you entered those two lines into a file called HELLO EXEC and then typed HELLO at your terminal, the output on the screen would be

```
HELLO WORLD
```

The parts of the EXEC are

/* .... */	A comment explaining what the EXEC is about. *All REXX programs must start with a comment*. If your program does not start with a comment, then the interperter will mistake your EXEC for something else, and it will not work.
say '...'	An instruction to display the part of the line between the quotation marks on the screen.

REXX EXECs can include commands to CP and CMS. It can also be used to call other EXECs. Here is an example that queries the time, makes SAS available, and then runs the SAS program.

```
MYSAS1 EXEC

/* An EXEC to run my sas program   */
/* Display the time      */
      'cp q t'
/* Get SAS              */
      'getme sas'
      'filedef inf disk my data'
/* Associate a data definition statement with a filename */
      'sas mysas'
```

An explanation follows:

/* .... */	Comment required for all REXX EXECs.
‘cp q t’	A CP command that tells the time; REXX interprets the string between the quotes as a literal. Commands other than REXX commands should be enclosed in quotes to avoid confusion. If the quotes were omitted in this command, the interpreter would first interpret the value of the variables CP, Q, and T. This may not be what you had in mind.
‘getme sas’	GETME is an EXEC written by UTCS staff; it allows you to use various products. In this case, we get all of the files necessary to run a SAS program.
‘filedef inf ...’	FILEDEF is a CMS command. This example assumes that the SAS program reads some input from a file defined as “INF”. For those familiar with MVS JCL, a FILDEF statement is equivalent to a DD statement.
‘sas mysas ’	Invokes SAS, which will look for a FILE called MYSAS SAS and execute it.

Now let’s look at an example that gives us a little more flexibility in terms of reading in arguments from the terminal and using those in a REXX EXEC.

```
MYSAS2 EXEC

/* A more flexible example of the above program */
      parse arg datafn dataft datafm saspgm rest

/* Read in the data filename, data filetype, data filemode,*/
/* the name of the SAS program, and any extra parameters */
/* IF any of the parms is null, then exit    */
       if (datafn = “) | (dataft = “) | (datafm =“) | (saspgm = “) ,
      then do
      say ‘Not all parms supplied EXEC is terminated’
      exit 1
      end
      else do
      if (rest ^= “) then
      say ‘Extraneous parameters ignored:’ rest

/* Define a DD statement call inf using the parms supplied*/
/* as variables                                           */
      ‘filedef  inf disk’  datafn dataft datafm

/* Run SAS */
      ‘sas’ saspgm
      end
```

This EXEC could be invoked by typing:

```
mysas2  july data a  analdta
```

An explanation:

/* ... */	Required comment.
parse arg datafn	“Parse arg” tells the interpreter to parse the arguments into variables. In this example, “datafn” is a variable that would contain the data JULY, “dataft” would contain DATA, “datafm” would contain “A”, and “saspgm” would contain ANALDTA. The variable “rest” is a catchall that will hold any extraneous arguments. This line also has a comment that extends over several lines.
if (data = ‘’)	This statement checks the parms (parameters) entered to make sure none were omitted. If any of the parms is equal to the null string, then a message is to be displayed on the terminal.
exit 1	Is a REXX instruction that causes the EXEC to be ended immediately. The “1” is the return code sent to the caller of the EXEC.
‘filedef ...’	This filedef is much like the one in EXEC MYSAS1, except here we use the parms we supplied on the command line.
‘sas’ saspgm	Here “saspgm” is used as a variable and is replaced.

Just for our FORTRAN users, here is an EXEC that compiles and executes a FORTRAN program. Note that the EXEC will not proceed to the execution phase unless the compile phase has completed successfully.

```
FORTRUN EXEC

       /*   Run a sample FORTRAN program   */
       /* Make FORTRAN files available */
        ‘getme fortran’
         ‘global txtlib vfortlib’
        ‘global loadlib vflodlib’

       /* Compile a sample program */
        ‘fortvs fortsamp’

      /* Get the return code */
         rccomp=rc

      /* Check the return code */
        if rccomp ^= 0 then do
         say ‘Compile step ended with return code:’  rcfort
         exit rcfort
        end

      /* Point to the data */
        ‘filedef ft05f001 disk fortrun data *’
         ‘load fortsamp (start’
```

Explanation:

A new construct in this example is the use of the variable RC. RC contains the return code of the previously executed statement. In this case, the return code is that from the FORTRAN compiler. The return code is stored in variable "rccomp" and is compared to zero. If the compiler's return code is zero, the file continues to execute. If it is not zero, the program displays a message on the screen and then exits.

As you can see, you can create a REXX EXEC to execute a series of often-used commands as if they were one command. REXX EXECs cut down on the number of keystrokes needed to invoke a program; an EXEC can also be designed to prompt you for any information required for the execution of the commands in the EXEC.

Running Batch Jobs

You can also use REXX to control Batch jobs. VMBATCH is a product installed on the VM/CMS system; it allows you to run unattended tasks or Batch jobs in the background, freeing your Virtual Machine for interactive work. On VM/CMS, a Batch job is a REXX EXEC. To run the example MYSAS1 EXEC in the background, enter the following at your terminal:

```
vmbatch submit mysas1 exec a  my data a
```

This sends the files MYSAS1 EXEC A and MY DATA A to a VMBATCH worker machine. The worker machine receives those files on its A disk and executes MYSAS1 EXEC. When the program is finished, the results are sent back to your Virtual Reader.

Documentation

The following manuals may be consulted or ordered at the UTCS Information Centre (4 Bancroft Avenue, Room 201):

IBM VM/SP System Product Interpreter User's Guide (SC24-5238-2)
This tutorial takes you through the basics of REXX with the aid of many examples.

IBM VM/SP System Product Interpreter Reference (SC24-5239-1)
This reference manual is strictly for those already familiar with the language.

The *VMBATCH User's Guide* (LISTING=VMBATCH) may be obtained through the DOCUMENT command on CMS; type

```
help document
```

for more information. This document may also be consulted at the Information Centre.

There is also online Help for both REXX and VMBATCH. Enter **help rexx** and **help vmbatch** respectively.

MVS to VM/CMS Utility Review

Herb Kugel
HERB at UTORONTO

UTCS has developed a series of utilities to help you convert from MVS to VM/CMS. These utilities deal with a variety of situations.

Several utilities are designed to process WYLBUR Format, OS/MVS card-image datasets, or any other OS FB (Fixed Block) dataset. Let's look first at partitioned dataset (PDS) libraries on disk.

WYLCVT

WYLCVT moves an entire PDS from MVS to VM/CMS and builds a VM/CMS file for each member. Each member is automatically given a Filename corresponding to the last qualifier of the PDS name and a Filetype corresponding to the member name.

Usage is simple; here is an example:

```
// EXEC WYLCVT
//SYSIN DD *
U09999.LIB
CMSLOGID
//
```

In this example, when U09999.LIB(M1) is received at CMSLOGID, it becomes LIB M1. That is, the newly created VM file has a Filename of LIB and a Filetype of M1.

In the above, as with all the WYLCVT programs, the library name is fully qualified, is given without quotes, and starts in column 1. Nothing else is allowed on the statement. The same is true of your VM/CMS logon id, CMSLOGID.

WYLCVT1

In some cases, you might prefer to have the member name correspond to the Filename and be able to create a consistent Filetype. You can do this with WYLCVT1 as is shown in the following example:

```
//  EXEC WYLCVT1
//SYSIN DD *
U09999.LIB
CMSLOGID
FORTRAN
//
```

Suppose, in the above example, the WYLBUR library U09999.LIB contains the members M1 and M2. These members, when received on VM/CMS account CMSLOGID, would be called:

M1 FORTRAN	(Filename Filetype)
M2 FORTRAN	(Filename Filetype)

WYLCVT3, UNLOAD

Perhaps you just want to convert your WYLBUR Format PDS library to an OS FB library and then unload that library onto tape for future use. UTCS has two procedures for this. The first is WYLCVT3, which does the actual conversion as shown in the following example:

```
// EXEC WYLCVT3
//SYSIN DD *
U09999.LIB1
//
```

Here U09999.LIB1 is a WYLBUR library. The program creates the unregistered OS FB dataset U09999.LIB.UNF. You may then use the UNLOAD procedure to unload that dataset onto tape as is shown in the example:

```
/*SETUP  UNIT=3400-5,VOL=(EXT=N1234,W)
// EXEC
UNLOAD,DSN='U09999.LIB.UNF',FILE=1,VOLID=N1234
```

In this example, the dataset U09999.LIB.UNF is written as file 1 on tape N1234. Both steps may be combined in the same job.

VM/CMS IEBCOPY and IEHUNMOV

An OS FB PDS (card image or not) that has been unloaded to tape using either of the MVS utility programs IEHMOVE or IEBCOPY can be processed through CMS. When in CMS, simply enter

```
help iebcopy
help iehunmov
```

for complete directions and examples.

Sequential WYLBUR and OS FB Datasets on Tape

You may have sequential WYLBUR or OS FB datasets on tape. If you wish, you may move these datasets directly to VM/CMS using the WYLGENER or UTCGENER procedures as shown in the following two examples.

For WYLBUR sequential datasets:

```
/*SETUP  UNIT=3400-5,VOL=EXT=N1234
// EXEC WYLGENER,FILE=2,VOLID=N1234,
//  DSNAME='U09999.WYLBUR.SEQ'
//LOGONID DD *
ZORRO
//
```

For OS datasets:

```
/*SETUP  UNIT=3400-5,VOL=EXT=N1234
// EXEC UTCGENER,FILE=2,VOLID=N1234,
//  DSNAME='USER.OSDATA.SEQ',
//LOGONID DD *
ZORRO
//
```

In both examples, file 2 of the standard-labelled tape N1234 is moved to disk and sent to the Virtual Reader of CMS user ZORRO. Because of the nature of the utility, the file is received by CMS under the name USER WORKSET (Filename Filetype). In both cases, the DSNAME parameter refers to the name of the tape file.

Lastly, with all the MVS routines discussed above, MSGLEVEL=(0,0) is recommended since the procedures contain a great deal of JCL that should not affect you and need not be printed.

Sequential WYLBUR Format Datasets on Disk

These are rare but must be converted with the WUNPRESS procedure as illustrated in the following example:

```
// EXEC WUNPRESS, INPUT='UO9999.LIB.SEQ',
// OUTPUT='U09999.OS.SEQ',
// SPACE='4'
```

In this example, the sequential WYLBUR dataset U09999.LIB.SEQ is converted to the OS card-image dataset U09999.OS.SEQ, with four tracks being allocated to it. This dataset may then be brought over to VM/CMS with the GETUTCA command on VM/CMS. For information on GETUTCA, enter:

```
help getutca
```

OS Fixed Block (FB) Datasets on Standard Label OS Tapes

On VM/CMS, you can read sequential FB OS datasets from tape to VM/CMS for processing. Enter:

```
help fromtape
```

for further information.

SAS, SPSS, and Special-Purpose Routines

SAS and SPSS libraries require special consideration because they are in direct access (DA) OS format. SAS libraries can be moved from MVS with the GETUTCA procedure in CMS. Only SPSS^x is available on VM/CMS. You must first have SPSS^x read your files and then use the SPSS^x EXPORT command to convert them to a form usable on CMS or elsewhere. The files can then be moved to tape or CMS in the same way as a character file.

There is also the rare case of a dataset created with the TSO editor using the NUM option. This dataset would be very difficult to process under VM because of the eight digits at the beginning of each line. UTCS has a tool to remove these digits. When in CMS, simply enter

```
help unn
```

for more information and examples.

Once you are in VM/CMS, you may read and write unlabelled (No Label) tapes by using the TAPDUMP and TAPLOAD procedures. Handling NL tapes is generally easier than having to work with OS Standard Label tapes. Enter:

```
help tapdump
```

and

```
help tapload
```

for more information on them, but please remember that these procedures are for NL tapes only.

If you have special problems moving your MVS datasets to CMS, please phone Herb Kugel at 978-4589 or Bill Fehlner 978-6509 for specific help or information.

Alternatives for the Gould and Calcomp Plotters

Terry Jones
TJ at UTORONTO

The Gould and the Calcomp plotters are both attached to the UTCS MVS service and will no longer be available when the MVS service ceases at the end of June.

If you want graphical output from SAS or FORTRAN, you will be able to use the PostScript devices available at 4 Bancroft Avenue (*not* McLennan Labs) to produce your output. The PostScript devices are for black-and-white printing only and are limited to 8.5x11-inch pages. Their very high quality output reproduces well.

SAS/GRAPH Users

The conversion from SAS/GRAPH to PostScript graphics devices is very easy. A SAS statement:

```
goptions device=ps300;
```

at the beginning of your SAS program directs SAS/GRAPH to produce PostScript (300 dots per inch) code. This PostScript that SAS produces is placed in a file of type PLOTFILE on your CMS minidisk, and you can then send that file to the PostScript devices with the SENDPS command. Note that plots are APPENDED to this file, so be careful not to plot yesterday's plots along with today's. Erase the file before running new plots.

Suppose that you have a file called SAMPLE SAS, which contains the GOPTIONS statement shown above and some procedures that produce graphics. A typical series of commands might go as follows:

```
getme sas
sas sample
sendps sample plotfile
```

If you are using SAS interactively, you will find that SAS has created a file called SASGRAPH PLOTFILE, which contains the PostScript plotting commands for your graphics.

FORTRAN Users

If you are using FORTRAN, you can convert your plotting programs to use a set of PLOTBASIC-like routines that produce PostScript code. It should be pointed out that only the basic plotting routines are available at the present time. The routines known as PLOTBASIC Extended routines are *not* available, and attempts to use them will result in error messages at load time. When compiling and loading a program that calls the plotting routines, you must include the name of the PostScript plot library in the LOAD command.

```
LOAD filename PLOTPS
```

would load your program *and* the plotting routines (PLOTPS is the name of the FORTRAN library of PostScript PLOTBASIC routines).

Assume you have a file called SAMPLE FORTRAN, which contains calls to do plotting. A typical series of CMS commands to compile, run, and send the plot from the program to the printer might look as follows:

```
getme fortran
global txtlib vfortlib
global loadlib vflodlib
fortvs sample
load sample plotps (start
```

(Execution begins; PostScript plot commands are written to disk. No FILEDEFs are given, so the file used is FILE FT97F001. Note that the plot output file (FILE FT97F001) is *overwritten* if it already existed.)

```
sendps file ft97f001
```

Unless a FILEDEF is used, the PostScript plotting commands are written to a file called FILE FT97F001.

continued...

Rates

Costs for the output are charged directly back to your CMS account. The internal rates for plotting on the PostScript printers are 20 cents per page plus 40 cents per minute. This generally results in plots costing between 50 cents and $2.00, depending on the complexity of the plot. The more lines drawn on the plot, the longer it takes to plot, and the more it costs.

WARNING

The PostScript plotting commands for a complex graph (especially with SAS) can create very large files. To avoid filling your regular minidisk, you may wish to allocate a temporary minidisk, using FILEDEF statements to direct the output to this minidisk. Also, sending the PostScript plot file with a PRINT command instead of a SENDPS command results in a *very* large listing. The file contains PostScript code, and in order for the PostScript device to interpret the PostScript code (as opposed to just listing it), you must use SENDPS.

For more information on using the PostScript devices for your graphics needs, please contact Terry Jones at 978-4924.

Letters

Re: Laptop Computers: Serious Travelling Machines by Mark Vanderkam

I found this article very informative but I thought there should have been mention of the variable voltage mechanisms that are available on some laptops. For example, this mechanism enables the machine to be used in European locations without having to rely on battery power.

I bring this matter to your attention because a graduate student in our department purchased a portable to be used in Great Britain this summer and the ability of the machine to use a different voltage was of great consideration. As it was, the Zenith machine he purchased *automatically* stepped down the voltage and therefore resolved the dilemma of international voltage fluctuation.

Eric Karonen
Department Secretary
Department of Behavioural Science
Faculty of Medicine
University of Toronto

Taking Some of the Mystery out of Mapping with SAS/GRAPH

Ronald Yachnin
Department of Geography

The maps in this issue of *ComputerNews* were compiled on SAS/GRAPH as part of my MA research into change in the spatial distribution of the origins of campers visiting provincial parks in southwestern Ontario. The Figure on the facing page is an outline map with labels that identify the locations of study origins. The cover illustration is a series of choropleth maps (from Gk. *choros*, place, *plethos*, magnitude) that delimit change in the number of campers per thousand residents originating from each of these locations over the last fifteen years. Clearly, these images are worth more than a thousand words and demonstrate the enormous potential of SAS/GRAPH as a cartographic tool. The purpose of this article is to illustrate some of the possibilities afforded by SAS/GRAPH's mapping facility in the hope of encouraging additional use.

SAS/GRAPH is the graphics component of the widely used SAS data analysis system. This companion software is capable of producing a wide variety of high-quality colour-graphic output and supports many video and hardcopy devices. In existence as a mainframe computing package for over a decade now, it has recently become available as a supplement to the SAS system for Personal Computers.

This software is especially valuable for its extensive library of map data sets. While SAS/GRAPH allows you to furnish your own SAS-readable map data sets, it also provides a host of useful ones for Canada and the United States. These include detailed outline map data sets of Canada with provinces, Canada with census divisions, U.S. with states, and U.S. with counties. Additional world and U.S. data sets are also available as an accessory to the SAS system, and some of them can be accessed online at UTCS. Anyone who has ever tried to create his or her own sets of geographic coordinates through digitizing, or some other such means, should quickly appreciate the value of this library.

SAS/GRAPH map data sets are generally of two types: unprojected and unreduced; and projected and reduced. In unprojected and unreduced map data sets, coordinates are stored as measures of latitude and longitude of the earth's spherical surface, which must be transformed or "projected" onto a flat two-dimensional plane prior to mapping. Storing coordinates in this way permits the easy joining of adjacent unprojected and unreduced map data sets (e.g., Canada and the U.S.). In projected and reduced map data sets, on the other hand, coordinates are stored as x,y values representing points on the earth's surface that have already been transformed onto a plane. Since the properties of the earth's surface (e.g. area, distance, direction, and shape) cannot all be preserved simultaneously in transforming it onto a plane, the possibilities for merging individual projected and reduced map data sets, most of which have been transformed using different projection techniques, are limited. An additional distinction pertains to the size of the data set. Because they specify map outlines in much greater detail. unprojected and unreduced map data sets contain many more coordinates than do projected and reduced map data sets.

This brings us to one of the limitations of SAS/GRAPH for Personal Computers. Due to the tremendous space requirements of unprojected and unreduced map data sets, these have not been included as part of the already burgeoning SAS/PC package. The potential for merging the projected and reduced map data sets currently supplied with the PC version of SAS/GRAPH is thus more limited than that associated with the unprojected and unreduced data sets of the mainframe version. This should not, however, deter potential PC users from using merged map data sets, for it remains possible to create these on a mainframe computer and download them for use on a PC.

Once a map data set has been compiled, generating simple maps is easy. It involves little more than invoking the software's GMAP procedure to link the map data set to a response data set containing the corresponding values of the phenomena to be mapped. Carefully chosen default values allow you to create simple choropleth, surface, prism, and block maps with a minimum of instructions while gaining experience in tailoring displays to suit your needs. Three other SAS/GRAPH mapping procedures that may also be used in conjunction with GMAP include: GPROJECT, which applies one of a number of projection techniques to an unprojected map data set; GREDUCE, which reduces the number of coordinates, and hence computing time, needed to draw a map; and GREMOVE, which eliminates unwanted boundaries from a map data set.

The sample maps appearing on the cover and in the Figure were created on a mainframe computer using SAS/GRAPH Version 5.16. All were produced from two map data sets, one containing southern Ontario origins, the other containing all origins. Both of these map data sets were compiled by projecting subsets of unprojected and unreduced SAS/GRAPH map data sets, while the latter also involved merging three of these.

The cover illustration is a good example of SAS/GRAPH's capabilities for choropleth mapping. Here, different patterns are associated with each distinct class of values to symbolize variations in the magnitude of the camper visitation statistics as they occur within the boundaries of the study origins. These classes can be defined in a number of ways (including by default) by specifying values for the midpoint of each class, or, as in this example, by setting up user-defined formats. Since geographic phenomena are rarely evenly distributed, defining classes is among the first procedure options for which you are likely to want supply your own values.

One of the limitations of SAS/GRAPH's mapping facility is that it does not allow you to display a map data set without first linking it to a response data set. To produce outline maps such as in the Figure, it is therefore necessary to assign a hypothetical numeric value (e.g., magnitude=1) to all spatial units and associate that value with an empty pattern using the choropleth option of the GMAP procedure. Although it is not a choropleth map by definition, the Figure was thus also produced by employing this mapping routine.

With respect to enhancing maps with text and simple line drawings, SAS/GRAPH may be regarded as reasonably flexible. However, while the software allows for good control over numerous elements including size, position, and font style, it also requires that x,y coordinates be specified for locating all lines and text except that associated with titles, footnotes, and legends. Thus, in relatively complex illustrations such as that in the Figure, which makes use of more than 90 sets of coordinates, adding text and lines can easily become one of the most time-consuming aspects of cartographic design.

In default mode, SAS/GRAPH permits only one map to be included in a single display/page. To create illustrations incorporating two or more maps, such as the examples provided, it is necessary to invoke the software's graphics catalogue management procedure, GREPLAY. This procedure enables you to subdivide a display area into windows of varying sizes, again by specifying bounding coordinates, and place different maps within each of these.

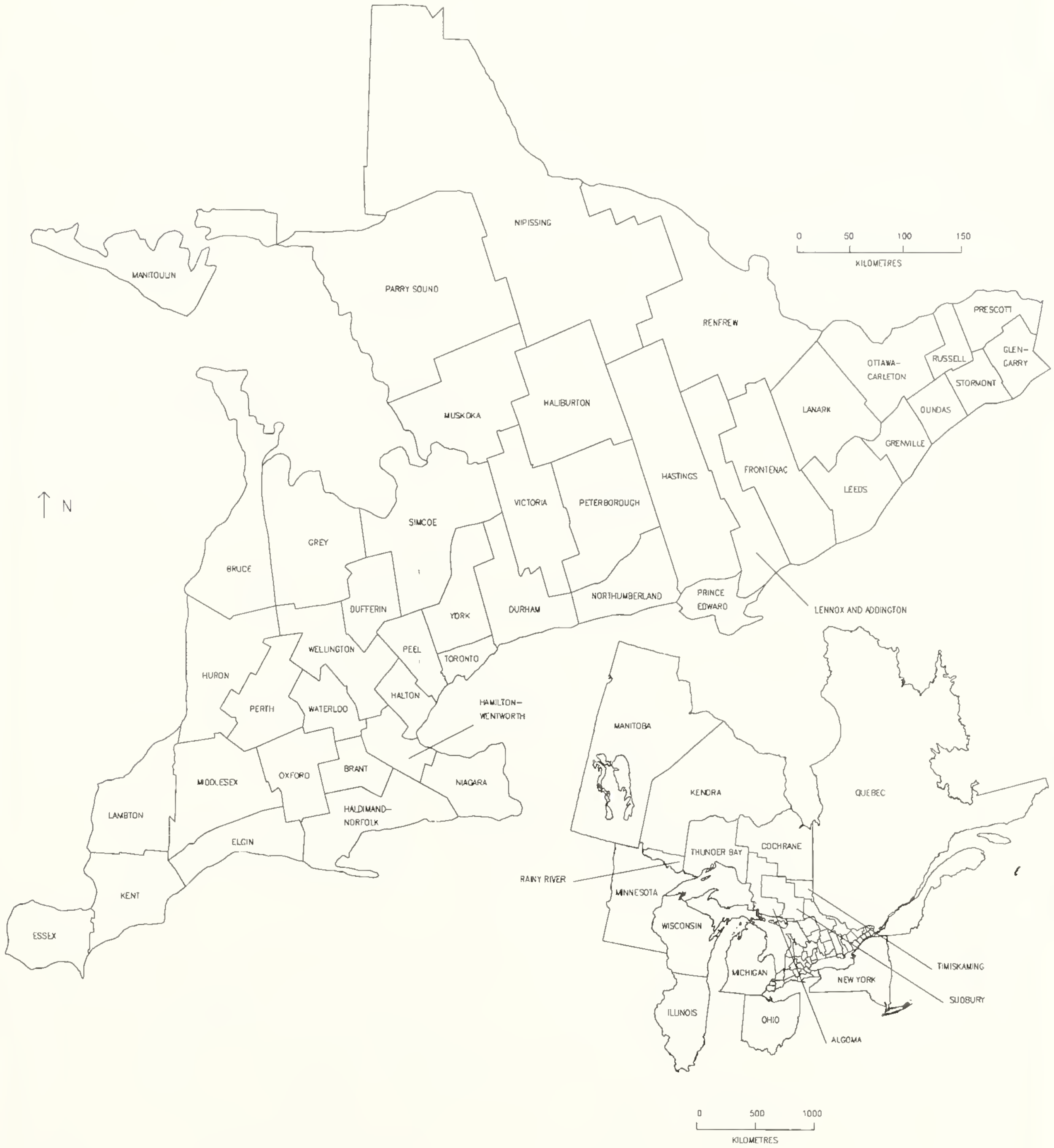
Two insufficiently documented points with respect to employing subdivided display areas are worthy of mention here. First, in order to maintain the appearance of certain types of maps across different windows, the latter must be of equal size. If, for example, the same choropleth map is placed inside two windows, of varying dimensions, not only will its size be different but so too will the density of its patterns. The maps in this issue were thus produced by placing maps of varying size into windows of equal dimensions rather than vice versa. Second, identifying coordinates for positioning text and line drawings is best done prior to placing maps into windows since these coordinates may only be designated in relation to the boundaries of the default display area. The location of the label “Toronto” in the Figure provides a suitable illustration of this point. Rather than being designated as 6.5 cm over and 8.3 cm up from the lower left hand corner of the 16x22 cm window in which it appears, it is designated as 8.1 cm over and 9.1 cm up from the respective boundary extreme of the 19x26 cm default display area associated with the PostScript device upon which it was printed.

Finally, a few cautionary words regarding storage requirements and producing hardcopy output. Since SAS/GRAPH map products often demand substantial computer resources to store and plot, care should be taken to manage storage efficiently and minimize the amount of hardcopy generated. Unfortunately, because the dimensions of display areas usually vary significantly between devices, it is often difficult to rely heavily on video for intricate design work.

For additional information on SAS/GRAPH and its mapping capabilities, please consult the *SAS/GRAPH User's Guide*.

For help with specific problems, you may call UTCS Advising Services at 978-HELP or contact Ron Yachnin, c/o *ComputerNews*.

FIG. STUDY ORIGINS



NOTE. COMPILED ON SAS/GRAPH

License Renewal for SAS under PC-DOS

Andrzej J. Pindor
APINDOR at UTORONTO

In accordance with UTCS' distribution policy, all users who acquired SAS under PC-DOS from UTCS must renew their license if they wish to continue using SAS/PC. When you renew, you will be given the authorization code for 1988-89. If you do not renew, your copy of SAS/PC will become inoperable sometime after July 1.

There is no new release of Base SAS or any of the modules already available through UTCS, so there will be no diskettes to copy. However, if you have not yet updated to Version 6.03, you must do so when you renew; in that case, you will have to borrow a set of diskettes from UTCS to transfer SAS/PC to your hard disk. A refundable deposit of $150 is required, and you must make an appointment for an overnight loan of the diskettes. (See the March 1988 issue of *ComputerNews* for details, or call the Information Centre at 978-4990.)

Because new modules were added in Version 6.03, the renewal fee will vary depending on which modules you have. Base SAS, SAS/STAT, and SAS/GRAPH are considered a group, and the fee is $80 per installation; SAS/FSP is another $20. Thus, if you need all four modules, the fee is $100. Another module, SAS/IML, may become available later this year. If so, the fee for that module will also be $20.

How to Renew

You will be contacted by mail with the necessary renewal forms. Alternatively, forms may be picked up at the UTCS Information Centre. Completed forms should be returned to Dale Wright in the Information Centre, 4 Bancroft Avenue, Room 201.

As in the past, payment for the renewal fee may be made from University or research funds. To do this, contact Dale Wright in the UTCS Information Centre. These arrangements may be taken care of when the completed renewal forms are returned, if the person bringing the forms has signing authority. If payment is by cheque or cash, proof of employee or student status must be provided. Once payment has been arranged, you will receive the new authorization code.

Further Information

For technical information about SAS under PC-DOS, to arrange for a demonstration, or for assistance in completing the registration form, please call Andrzej Pindor at 978-5045.

SAS Version 6.03 Available on UNIX

Bill Fehlner
FEHLNER at UTORONTO

SAS Institute Inc. announced the availability of SAS software running under the UNIX operating system at the SUGI conference at the end of March. Hewlett-Packard's HP 9000 Series 300 has been chosen for the first UNIX operating system implementation of SAS. Version 6.03, very similar to the current MS-DOS implementation of SAS for PCs, runs under HP-UX, Release 5.22 or later. Support for the HP 9000 Series 800 will be available later this year.

UTCS now has an HP 9000/330 system available in the Micro Lab (4 Bancroft Avenue, Room 201) for testing and demonstrating SAS under UNIX on what is essentially a single-user workstation. Hewlett-Packard has lent the hardware to UTCS and has also provided technical assistance in installing and configuring the system. All components of SAS currently available with Version 6.03 have been installed, including Base, STAT, GRAPH, FSP, IML, and AF.

Two configurations of hardware have been available for initial tests of the system. In both cases, UNIX and SAS were installed on a 131-Megabyte (MB) hard disk. HP-UX requires approximately 90MB, and SAS occupies 34MB for the six modules that were installed. Thus if you are considering moving to the UNIX environment to take advantage of higher speeds and larger memory, you may have to consider getting a larger hard disk.

On the positive side, an HP 9000/319 workstation with 8MB of memory and a highspeed disk controller was roughly eight times faster than a Zenith AT (286 based with an 8 MHz clock). The HP 9000/330 workstation has 4MB of memory and the standard disk controller. It was slightly slower (2 to 10%) than the HP 9000/319 workstation on the same set of simple benchmark programs. In both cases, one is no longer held back by the very stringent restrictions on model size and the number of variables imposed by the MS-DOS 640KB limit on RAM.

Although the two hardware configurations tested are still slower by about a factor of ten than SAS running under VM/CMS on the UTORONTO mainframe, the ability to run SAS programs in the background under UNIX makes UNIX a more viable alternative than MS-DOS for those with time-consuming programs. One or more SAS programs can be started in background mode, and the UNIX system is still available for interactive work in the foreground, either with the SAS Display Manager or with other UNIX applications.

How well does SAS fit within UNIX?

SAS Institute has done a good job in implementing SAS Version 6.03 within the UNIX environment. In general, the interface with the operating system is flexible, and the support for network operation seems to be better than with the DOS environment. SAS 6.03 has been enhanced in a number of specific ways to work with other features of the UNIX operating system. Some examples are:

- You can associate a SAS file reference with the standard input or output of any arbitrary UNIX command or program with the PIPE device type on a FILENAME command.
- In UNIX, the task of managing the printer resources is given over to a task called the line printer daemon. You can use the PRINTER device type on a FILENAME command to route output directly to a printer. Both destination and printer options can be included in the FILENAME command.
- The line printer daemon handles graphics hardcopy devices as well as printers. SAS/GRAPH software includes a special GACCESS method, which can be used to send the graphics stream to a plotter or printer in graphics mode via the UNIX *lp* command.
- SAS programs are easily incorporated into a shell script and use the standard I/O for source, listing, and log files. This could be used to develop applications that use other programs along with SAS for the solution.

At this point, SAS software under UNIX is licensed for one workstation at a time. For an HP 9000/318 or 319, the current price for Base, STAT and GRAPH is US$1300 for the first year and US$650 for subsequent years. A site license would reduce these license fees significantly. Such a site license for the University of Toronto is a possibility and depends to some extent on the number of interested users. If you are interested in seeing SAS under UNIX, even if you are using hardware other than HP or are just considering UNIX as an alternative, please contact Bill Fehlner at 978-6509.

Summer Hours

The University of Toronto will observe summer hours from July 4 through September 2, 1988. UTCS' office hours will be 8:45 a.m. to 4:30 p.m. during this time.

PC Graphics using GAUSS

Andrzej J. Pindor
APINDOR at UTORONTO

A previous article in *ComputerNews* described certain features of the numerical and statistical software package GAUSS. This package also includes a module for high-resolution graphics. Graphs are created with resolution 4096 x 3119 pixels, and you can zoom into selected portions of the graph to see more detail. A variety of graphics boards and a wide selection of hardcopy devices are supported.

The following types of plots are available:

- Linear 2D plots of functions and data — can also be used to draw any 2D objects constructed out of arcs and lines
- Semi-log plots with log x-axis
- Semi-log plots with log y-axis
- Plots with logs on both axes
- Polar plots
- Bar charts
- Contour plots
- Linear 3D plots of curves and data
- Plots of surfaces of objects — this is primarily used to graph 3D functions (3D routines allow you to view objects from any angle and distance).

Figure 1 shows an example of a surface plot and *Figure 2* an expanded detail of this plot. Once a graph is created, parts of it may be selected and studied in detail since, as mentioned above, the graph is created

Figure 1

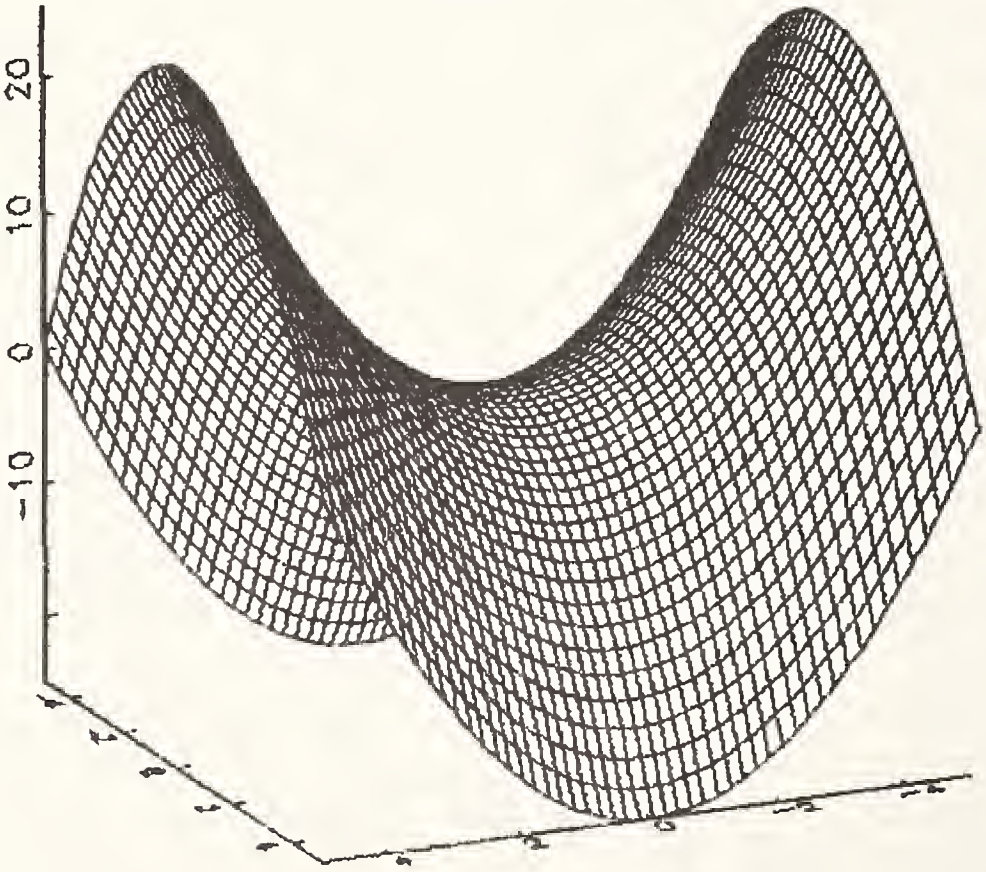
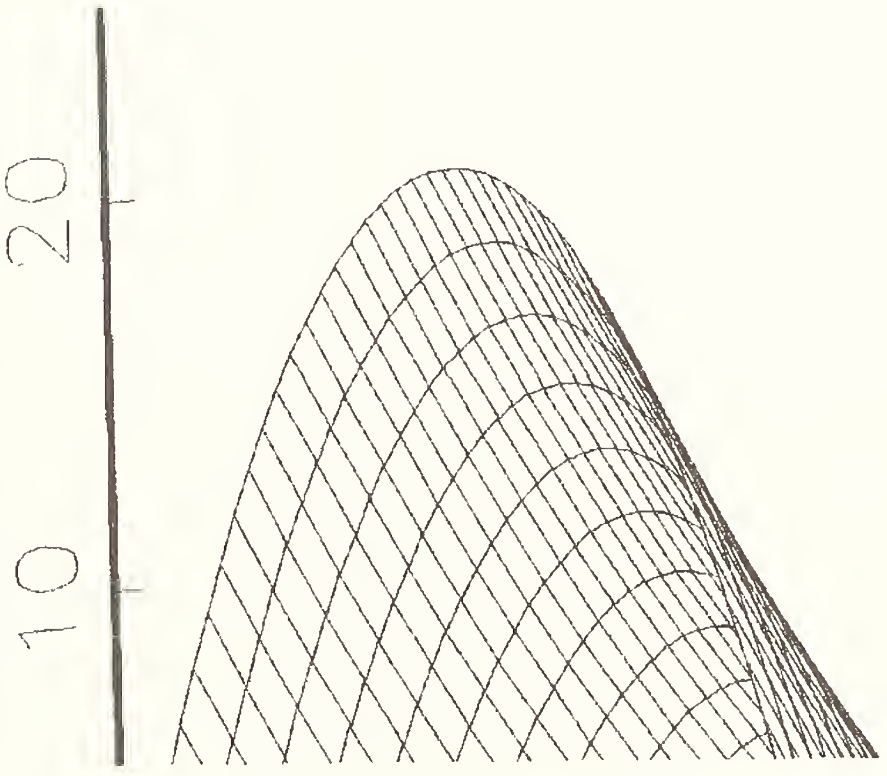


Figure 2



with a very high resolution. Details can be displayed with magnification of up to factor 8. The detail in Figure 2 is magnified by factor 5.

In order to compare GAUSS graphics code and SAS/GRAPH (Version 6.03), the same 3D surface was created using both packages. GAUSS created the graph three times faster, even though it had to generate about 50 times more pixels.

GAUSS provides a fair amount of flexibility in annotating plots, such as labelling the axes, placing a text anywhere on the plot, and choosing fonts, although the choice is perhaps not as wide as for SAS/GRAPH.

If you have any questions concerning the product or would like to try it out, please contact Andrzej Pindor at 978-5045.

Arrival of the Image Scanner

Terry Jones
TJ at UTORONTO

UTCS now has an image scanner available in the Micro Lab area, Room 201, 4 Bancroft Avenue. A scanner allows you to capture an electronic "snapshot" of a photograph or drawing and store it on your computer. Once you have this electronic image, you can use it in a number of ways including merging it in documents and publications. You can also use special programs to edit or otherwise manipulate the image.

The scanner is a DEST PC Scan 2020. It is capable of scanning images in resolutions as high as 300 dots per inch and can store grey-level information for each point it scans. It is also capable of scanning pages of text. In other words, it can recognize the letters on the page and create a word-processing document from them.

The DEST scanner attaches to either the IBM PC or the Apple Macintosh machines. No matter which environment you want to scan images or text into, the DEST scanner can be connected appropriately.

Pages being scanned are fed through the machine. They must be cut-sheet pages and can be up to 8.5 inches wide and up to 14 inches long. Pages from books would have to be removed from the book or photocopied before scanning.

Both line art (black-and-white drawings) and photographs can be scanned. The DEST is capable of storing grey-level information for each spot it scans, allowing very accurate scanning of photographs. Colour photos convert to black and white (greys) as they are scanned. (See article "Scanning Images: Line Art/Halftone/Grey Scale" elsewhere in this issue for more information on the advantages and disadvantages of various scanning techniques possible with the DEST scanner.) Pictures printed in books are already halftone images and will not scan in as well as original photographs.

The scanning software is capable of saving the scanned image in a number of different file formats. One of the forms is usually appropriate and compatible with the software you want to use the image with, whether this be Desktop Publishing, Drawing, Image-enhancement or Paint-type applications. The more common forms for saving images are TIFF (Tag Image File Format) or EPSF (Encapsulated PostScript) files, but ultimately the software you plan on using the images with determines which form the file should be saved in. Check what file formats your software can use before scanning in your images. (For more information on TIFF and EPSF image file formats, see the article on page 24.)

Text scanned in can be saved as plain ASCII text or as word-processor-specific files. Once again, you should know which program you plan to use the data with before you scan anything in. The text scanning capabilities of the DEST PC Scan 2020 are limited to a small number of fixed-width fonts and sizes and only one or two proportionally spaced fonts from a particular laser printer. This, combined with the fact that it needs cut sheets, makes it generally unacceptable for scanning books or magazines, which are almost exclusively printed in proportionally spaced fonts.

To use the scanner, call the Micro Lab at 978-5601 to book the PC (Mac or IBM) and the scanner. The cost of using the scanner with one of the PCs (Mac or IBM) is $3.00 per quarter hour.

Image files can be quite large. When you come in to scan an image, bring enough diskettes to hold the images you want to scan. A 3x5-inch photograph can easily take 800KB if scanned at the highest resolution with grey-level information stored.

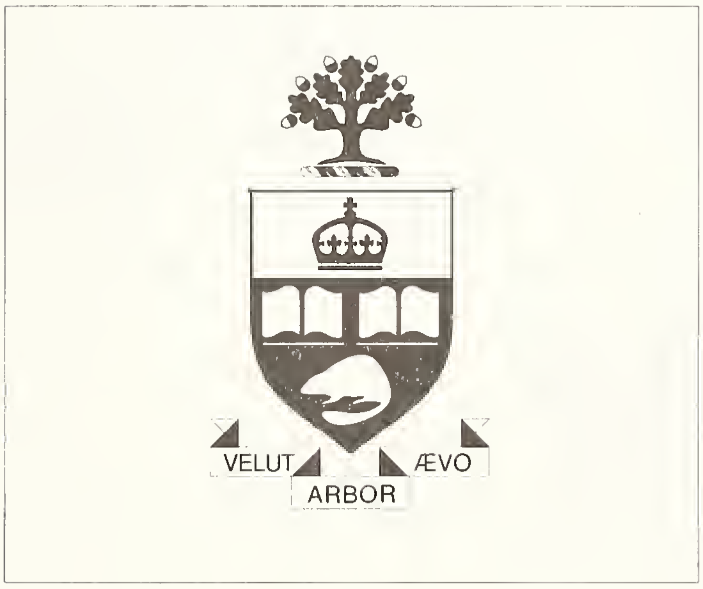
Scanning Images: Line Art, Halftone, Grey-Scale

John Bradley
BRADLEY at UTORONTO

The arrival of the DEST scanner on campus and the possibility of converting images into an electronic form (called a digital image) requires at least a basic understanding of a whole new technology. In short, there are several different ways to store and convert scanned images — based on the type of image and the use you intend to put it to.

Traditionally, publishers have divided images into two categories, line art and halftone. The division was necessary because of the basic principle of the printing technology: each spot on the page either has ink on it or doesn't. If you are printing with black ink on white paper, for example, each spot on the page is either fully black or fully white — the printing process is not capable of directly printing any shade of grey. The modern laser printer has exactly the same restriction.

LINE ART ***(Figure 1)***



Art that consists simply of black or white areas is usually put into the line art category. The U of T coat of arms (shown in *Figure 1*) is an example of line art. Until the late 1800s, line art was the only type of art that could be printed. With the development of the photographic process, printers began to look for ways to print photographs as well. This was a more complex problem since a photograph contains many shades of grey as well as black and white areas. How was a printing process that produces either black or white on any spot on the page going to handle greys? The answer appeared with the invention of the halftone image. The first halftone image in a popular publication appeared in *The New York Daily Graphic* in 1880.

In the traditional printing process, the halftone process works by converting the images into a pattern of black and white dots of various sizes, too small to be seen individually at normal reading distances. Our eyes merge the pattern into a shade of grey — areas with many smaller black dots (and, hence,with a large proportion of white areas) appear as a lighter grey than areas with many slightly larger black dots that cover a larger proportion of the area. As we shall see below, this idea has been adapted to the digital image.

Computer systems have evolved even more sophisticated ways of dealing with images. In most computer-stored images, the image is broken into a grid of many small squares called pixels (usually between 60 and 300 per inch). The actual number of pixels per unit of area is called the image's resolution. In bi-level images, each pixel is either black or white. In grey-scale images, each pixel can take on one of several shades of grey in addition to being fully black or fully white. The number of shades of grey depends upon how much space is set aside in the computer representation of the image to store the grey level for each pixel — typical numbers are 16, 64, or 256 different shades of grey for each square. Until recently, most image formats for personal computers were restricted to bi-level images. This was because computer display screens and printers were inherently bi-level devices, and bi-level descriptions of images produce much smaller files than grey-scale images. Furthermore, the early paint-type software was bi-level in its orientation. Both PC Paintbrush and MacPaint are essentially bi-level (with some further limited colour options for PC Paintbrush). Today, grey-level screens are priced within the personal computer price range, and storage restrictions are being lifted, making bigger data sizes more manageable. Furthermore, although laser printers are still really bi-level devices, the more sophisticated ones (such as PostScript printers) have conversion abilities built in, which automatically convert a grey-scale description of an image into a halftone for printing. Hence, the pressure is on providing methods to input images using grey-scale encoding schemes. Many scanner manufacturers are meeting this challenge with new products.

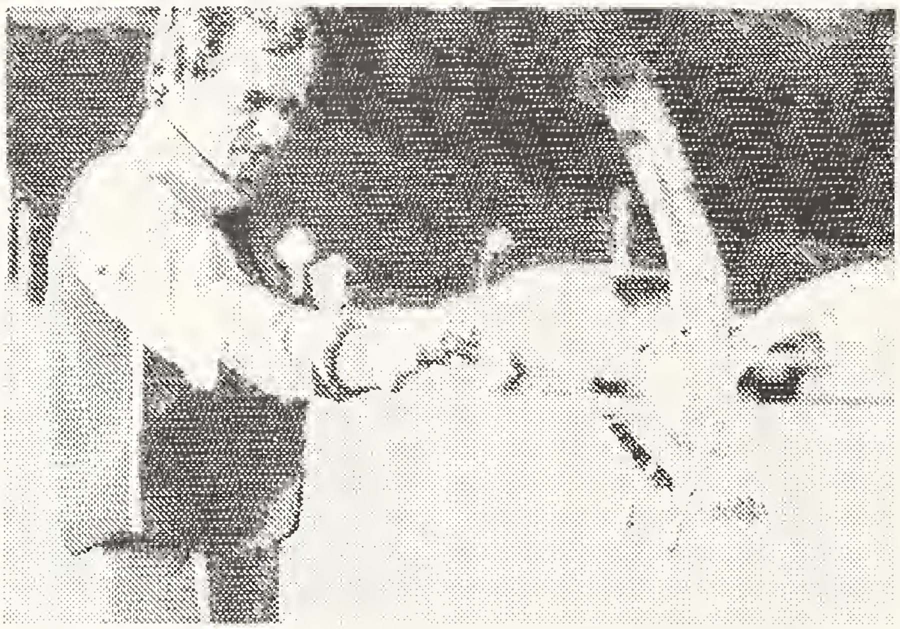
The DEST Scanner (and most other modern scanners in its price range) can handle an image as line art, halftone, or grey-scale.

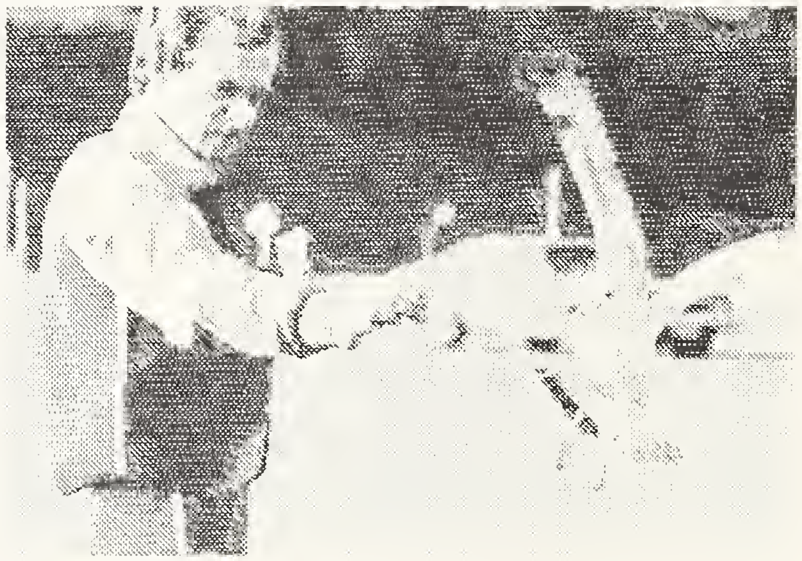
When an image is read as line art, it is assumed to be an image that does not have shades of grey in it — each spot on the image is either black or white. When the image is scanned, the computer software that runs the scanner produces an image where each dot on the image is also either black or white. If the resolution is high enough, a scanned line art image will look quite good. However, scanning a photograph as line art demonstrates what happens when the scanner tries to convert shades of grey into either black or white; the image is not very successful because it was not a bi-level object.

If the image is scanned as halftone, then the scanner software tries to create an image in a fashion similar to the traditional halftoning process we described earlier. Pixels — each of which can only be black or white — are grouped into larger squares with, say, four to a side. By varying the ratio of black and white pixels in each square, the overall appearance of the square is affected. Clearly, if all the pixels are white the square will look as white as possible, if all the pixels are black the square will look as black as possible, and if half the pixels are black the square will look halfway in between.

The illusion of grey levels produced by halftoning only works if the pixels and their combination into squares is small enough to fool the eye. Pixels at about 300 dots per inch can render a pretty good picture. For an example of a photograph scanned as a halftone at 300 dots per inch, see *Figure 2.* To show you how the halftoning is accomplished we have expanded a small part of the picture (the bird's head). You can see the pixels being grouped into collections of dots.

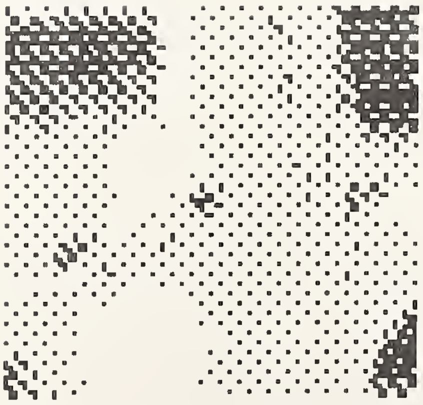
HALF-TONE (Figure 2)





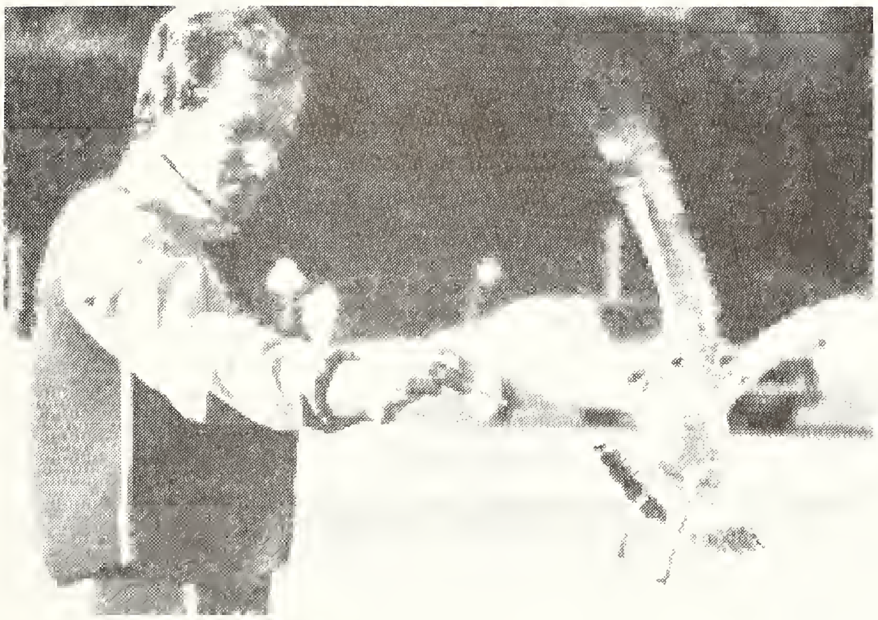
(reduction)

This is our first experiment in sending scanned images for offset printing; we have instructed our printer to treat them as text. As we go to press, we do not know for sure what quality of image our readers will see.
— Ed.

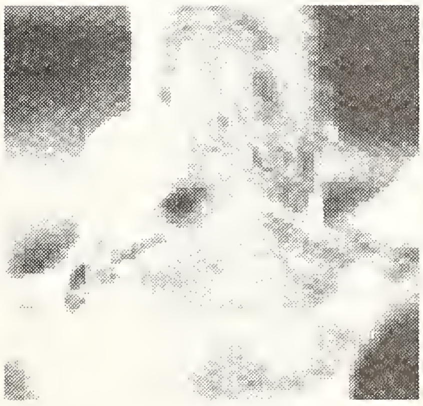


(expansion)

GREY-SCALE (Figure 3)



(reduction)



(expansion)

Computer halftones have some advantages. They can be stored in a relatively small space (the image in *Figure 2* takes up 76KB) and, if the proper file formats for storage are selected, can be used in many computer programs. One major problem is that they do not scale well. If you change the figure's size (shown also in *Figure 2*), complex interference patterns, called moiré patterns, often appear.

A more recent development is grey-scale images. As mentioned above, in this format, each pixel can be not only black or white, but can take on various shades of grey. UTCS' new DEST Scanner is able to scan an image as a grey-scale image, and allows each pixel to take on one of 256 shades of grey. In *Figure 3* we can see the same image scanned as a grey-scale image, with a resolution of 150 pixels per inch, but with each pixel capable of 256 grey shades. When we expand the bird's head we can immediately see the fundamentally different nature of the image.

It is obvious that grey-scale images can be resized without the appearance of moiré patterns. However, since there is so much more information stored about each pixel, the files that store them are significantly larger (the file for *Figure 3* was 233KB). In addition, not all desktop-publishing software can handle true grey-scale images, although all can handle bi-level halftones by dealing with them as Paint images. On the other hand, software such as ImageStudio, which is now becoming available, allows you to edit photographs stored in grey-scale images in the same way that you have been able to work with line art stored as bi-level images in Paint programs. ImageStudio gives you tools, similar to those available to a darkroom specialist, which allow you to manipulate photographic images. These tools have little use in a bi-level image, but, conversely, bi-level image programs such as MacPaint do not provide very good tools for working with halftone images.

Suppose you wish to scan an image. How do you decide whether to scan the image as line art, halftone or grey-scale? Well, if the image consists of only lines or solid black areas such as a logo or a line drawing, then the image should probably be scanned as line art with a relatively high resolution, such as 300 dots per inch. This will produce a high-quality image that will print as clearly as possible on modern 300-dots-per-inch laser printers.

If your image is a photograph, you have two choices: you can scan the image as grey-scale or as halftone. If file storage space is at a premium, or if your software cannot handle grey-scale images, then your only real choice is halftone, and you should scan at a resolution of 300 dots per inch. The resulting image file will print well on laser printers but cannot be easily edited or resized.

If possible, you should consider scanning a photograph as a grey-scale image. This gives you the most flexibility and the highest quality image but results in significantly larger files. We have found that grey-scale images of 64 shades of grey or more, at a resolution of 150 dots per inch produces very good quality images, even on high quality typesetting devices such as the Linotronic.

Once you've scanned the image, you must select a file format to save it in. See the following article for some discussion of the strengths and weaknesses of the two most popular formats for saving grey-scale images. Both line art and halftone images are, ultimately, types of bi-level image formats, and many file formats can be used. With UTCS' DEST Scanner, for example, you can save both line art and halftone images as a MacPaint, SuperPaint, PC Paintbrush, Encapsulated PostScript, or TIFF file. The one you choose depends on what you plan to do with the image after you have saved it and what your desktop-publishing or editing software is able to handle. A MacPaint image, for example, implies a resolution of 72 pixels per inch in each direction, and this proves to be too coarse for most halftone images.

File Formats for Grey-Scale Images: TIFF vs EPSF

John Bradley
BRADLEY at UTORONTO

Desktop-publishing (DTP) software depends upon file standards for its very existence. This is because the mainstream DTP programs such as Ventura, PageMaker, or XPress all act as integration tools, allowing you to merge text and graphics that other programs or pieces of equipment (such as a scanner) produce into a single document. If DTP programs are to merge this material, they must be able to read and understand the files produced by the various source programs (such as Microsoft Word and MacPaint).

Scanners, and the availability of software that can manipulate grey-scale images, have added another type of graphical information that DTP programs need to recognize. This article will discuss two encoding schemes, TIFF and EPSF, which are widely accepted for handling grey-scale image data. Other formats have been defined for image data (such as Letraset's RIFF format), but none is as widely accepted as TIFF and EPSF.

Both TIFF and EPSF file formats can be used to store bi-level images, but this article will focus mainly on their grey-scale capabilities.

TIFF

In the fall of 1985 several major players in the DTP and scanner industries (Datacopy, DEST, Hewlett-Packard, Microtek, Aldus, and Microsoft) joined together to produce the TIFF specification. TIFF (Tag Image File Format) was designed as a way of storing and exchanging the digital-image data that typically comes from a desktop scanner or a paint program. It was designed for both the PC and Macintosh computers, and images stored in the TIFF format can be moved successfully from one computer to the other.

TIFF is independent of any particular printer. The *application* program (such as PageMaker) translates a TIFF image into instructions for the particular printer it is driving. Thus, TIFF images can be printed on any printer driven by the application program.

EPSF

EPSF (Encapsulated PostScript Format) takes advantage of PostScript's special ability to treat a collection of PostScript instructions as if they were a single entity that could then be incorporated into a larger collection of PostScript instructions. An image described as an EPSF file contains PostScript instructions that, when sent to a PostScript printer, cause the printer to draw the image. The term "Encapsulated" comes from the fact that properly constructed PostScript files can be incorporated into output from an application program, and can even be scaled and positioned without the application program needing to understand the Encapsulated PostScript code. All the application program need do is copy the PostScript code to the printer with its own set of PostScript instructions. Although in this article we are talking about EPSF formats for image files, EPSF can also be used to describe object-oriented graphics (such as the kind produced by FreeHand or Illustrator).

There are two varieties of EPSF files. The simplest form consists solely of the PostScript instructions, plus some information that indicates the size of the resulting graphical image. If a program such as PageMaker is asked to print this file, it displays on the screen a grey box the size of the image. It cannot display the image itself since it doesn't understand the PostScript code that describes it. However, when the time comes to print, PageMaker copies the PostScript code to the printer, and the printer actually prints the image described by the PostScript text — if, and only if, the printer is a PostScript printer.

A more complex form of EPSF files contains two descriptions of the image: the PostScript code (as discussed above) and a screen form of the image. The screen image is used within the application program so you can see the image, but only the actual PostScript instructions are sent to the printer. The program that originally created the EPSF file has the job of ensuring that the screen version of the image is similar to the PostScript format. There are two variants of this form of EPSF file, one with a screen version of the image suitable for display on the Macintosh, and one suitable for display on the IBM. Hence, EPSF files containing a screen image for the Mac are not compatible with the IBM, and vice versa.

It is important to understand that an EPSF file can be positioned, scaled, and printed by a DTP program without the program understanding the image descriptions the file contains. This is in contrast to the TIFF file format, where the DTP program must understand the format and translate it into instructions for the laser printer. EPSF files can be created by several scanners and can be handled by several DTP programs. However, since the real description of the image is in the PostScript code, the image cannot be printed on printers that do not understand PostScript.

Which to choose?

Since UTCS' new scanner can produce both the EPSF and TIFF forms of the graphics image, how can you choose which format to use? The decision is usually based on what software and printer you plan to use to print the image:

1. Not all DTP programs can read both TIFF and EPSF files. Ventura Publisher, for example, cannot work with TIFF format, but can print EPSF files. If your program can handle only one form or the other, your decision might be made for you.

2. Only PostScript printers can print EPSF files. PageMaker on the IBM PC, for example, is not able to send an image file in EPSF format to a Hewlett-Packard LaserJet printer, although the same program can send the EPSF file to a PostScript printer.

3. Image-manipulation programs such as Letraset's new ImageStudio program cannot work with EPSF format files but can handle the TIFF format.

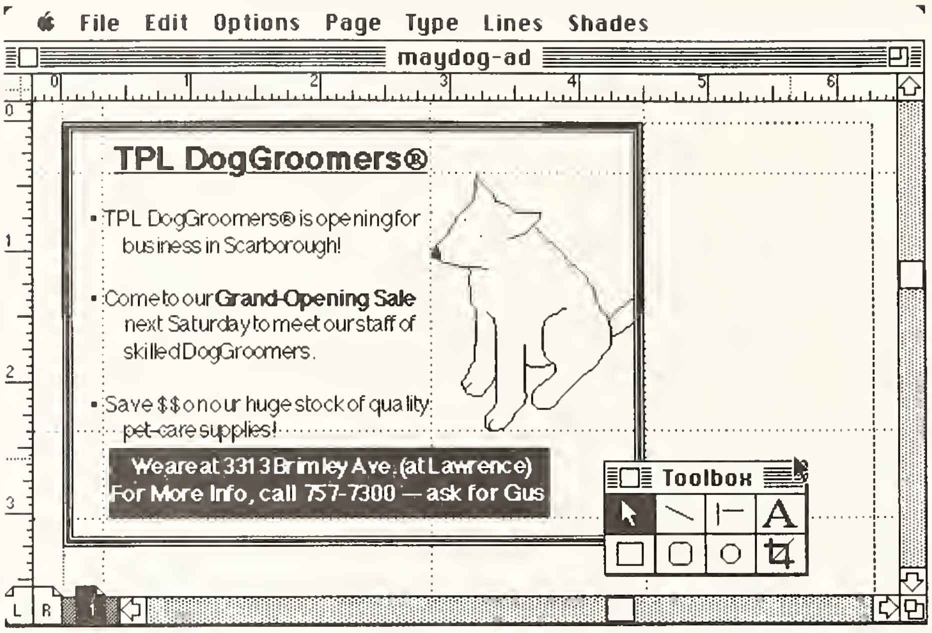
Clearly, if your software is able to handle it, TIFF is a more flexible format for image data since (a) your printing software can probably print it on several different types of printers, and (b) programs such as ImageStudio can be used to edit the image before you print it.

EPSF format should be produced only if you are using a program such as Ventura Publisher that is not able to handle TIFF files. Bear in mind also that you will be able to print the image on a PostScript laser printer only.

PageMaker and Desktop Publishing

Mark Vanderkam

People who create any kind of documents — newsletters, business cards, memos, magazines, books, and more — should know about desktop publishing (DTP). DTP is a fairly new computer application that has won applause from all sides and has been called "revolutionary." While some publishing professionals may dispute such claims, none will deny that the new DTP software packages can easily do what no other personal system can do. A close look at the most popular DTP package, Aldus' PageMaker, will demonstrate some of the power available in this new field. PageMaker was originally designed for Macintosh computers, but it became so popular that Aldus released a version for the IBM PC world.



TPL DogGroomers®

- TPL DogGroomers® is opening for business in Scarborough!
- Come to our **Grand-Opening Sale** next Saturday to meet our staff of skilled DogGroomers.
- Save $$ on our huge stock of quality pet-care supplies!

We are at 3313 Brimley Ave. (at Lawrence)
For More Info, call 757-7300 — ask for Gus

Figure 2

The Paste-Up Problem

Go into almost any newspaper's layout department and you will see that layout or "paste-up" work is a tedious, exacting process. Paste-up is done when preparing your artwork or document to be sent to the press for printing. If you want to create a business card, you attach your name, company logo, address, and telephone number to a card-size piece of white paper. To do this you need scissors or a knife, glue or wax, and crisp printouts of your logo and personal information. It also helps if your layout paper has faint grid-lines as guides for lining up the elements. While a business card is very straightforward, you can imagine how many dozens of pieces must be pasted-up to create a single newspaper page! It is a true marvel that *all* of this work can now be done on relatively inexpensive microcomputers.

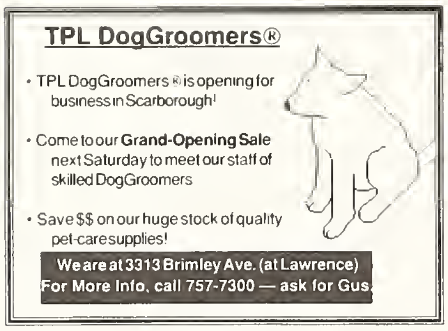


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Figure 1

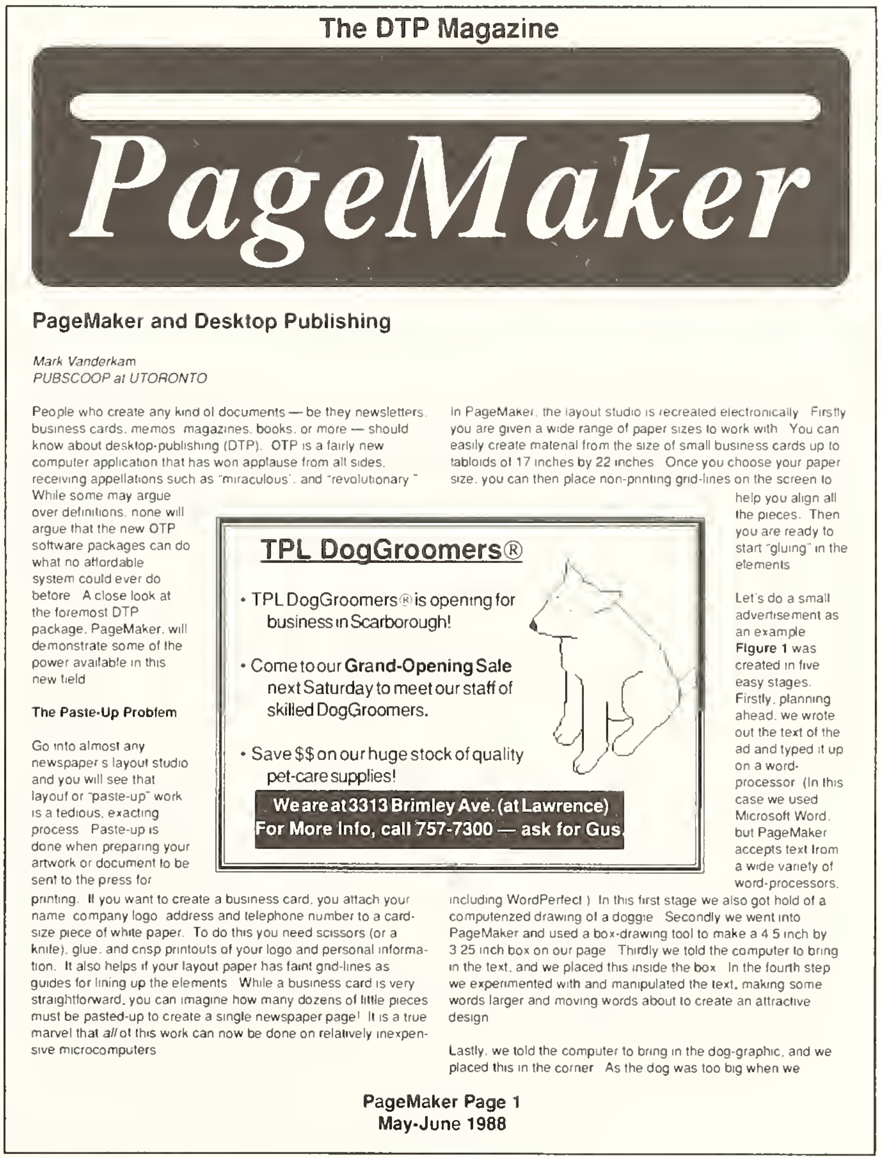
In PageMaker, the layout studio's paste-up board is recreated electronically. First you are given a wide range of paper sizes to work with. You can easily create material from the size of small business cards up to tabloids of 17 inches by 22 inches. Once you choose your paper size, you can then place nonprinting grid-lines on the screen to help you align all the pieces. Then you are ready to start "gluing" in the elements.

As an example, let's do a small advertisement for "TPL Dog Groomers." *Figure 1* was created in five easy stages on a Macintosh SE computer. First, planning ahead, we wrote out the text of the ad and entered it with a word processor. (In this case we used Microsoft Word, but PageMaker accepts text from a wide variety of wordprocessors). In this first stage we also got hold of a computerized drawing of a dog. Second, we went into PageMaker and used a box-drawing tool to make a 4.5-inch by 3.25-inch box on our page. Third, we told the computer to bring in the text, which we placed inside the box. In the fourth step, we experimented with and manipulated the text, making some words larger and moving words about to create an attractive design.

Last, we told the computer to bring in the dog-graphic, and we placed this in the corner. As the dog was too big when we brought it in, we easily shrank it down to the precise size required. Total elapsed time to make the ad: 15 to 20 minutes (not including the time someone originally took to draw the dog).

If you have experience with paste-up, you can see how clean and neat PageMaker is. It is easy to place text and graphics on the same page, to have several stories on one page, and also to thread articles over a few or even dozens of pages. PageMaker allows you to move and reposition elements at will, and it has tools for drawing boxes, circles, ovals, and lines of many sizes and descriptions. You can also zoom-in on the screen to permit an enlarged view of your work area, or you can "step back" and view one or two entire pages in miniature, to get a sense of the overall page design.

Figure 2 shows a Macintosh screen view of the ad in PageMaker. Note the rulers for precise measurements and orientation. (Rulers can be shown in inches, inches decimal, millimeters, picas, or ciceros.) Note also the nonprinting grid-lines used for alignment. At the bottom of the ad you can see that reversed lettering (white letters on black background) is used. This is another simple PageMaker tool that can greatly enhance your titles and design. For those needing professional typesetting abilities, automatic and manual kerning is available. (Kerning is the process of tightening text, removing unattractive white space between letters.) A number of other features such as automatic hyphenation (using a built-in expandable 100,000-word dictionary) and the ability to set up a design template, which will repeat on every page, also contribute to PageMaker's appeal.



The DTP Magazine

PageMaker

PageMaker and Desktop Publishing

Mark Vanderkam
PUBSCOOP at UTORONTO

People who create any kind of documents — be they newsletters, business cards, memos magazines, books, or more — should know about desktop-publishing (DTP). DTP is a fairly new computer application that has won applause from all sides, receiving appellations such as "miraculous", and "revolutionary." While some may argue over definitions, none will argue that the new DTP software packages can do what no affordable system could ever do before A close look at the foremost DTP package, PageMaker, will demonstrate some of the power available in this new field

The Paste-Up Problem

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PageMaker Page 1
May-June 1988

Figure 3

As demonstrated with the dog-graphic, PageMaker is able to import graphics files. The files you can import differ between the Macintosh and PC versions of PageMaker, though both versions can use a large number of file formats from many different graphics programs. PageMaker is able to read graphics files that usually cannot be opened unless that file's software is present. PageMaker is also able to save entire PageMaker pages as Encapsulated PostScript files (see preceding article). *Figure 3* is a PageMaker page saved as a graphics file and then shrunk down for an attractive effect.

PageMaker Course Taught at UTCS

Over a dozen participants and observers attended our first ten-hour PageMaker course in January. As DTP grows in popularity, increasing numbers of users are switching to it from traditional methods of paste-up. This course, which runs about once every two months, is a good overview of PageMaker, giving participants practice with the tools needed for producing documents. Contact Irene Rosiecki at 978-4565 for registration information. The next article gives two examples of how PageMaker is being used at U of T.

PageMaker at U of T

Mark Vanderkam

The School of Graduate Studies (SGS) recently took a big technological leap into desktop publishing — and as a result will save $12,000 to $15,000 per year! SGS produces a 312-page calendar, and this year for the first time they did almost the entire project with PageMaker software on an IBM PC-AT clone microcomputer with hard disk.

In the past, their calendar was commercially typeset. This is an expensive and somewhat problematic method, requiring a large amount of coordination between the printing company, SGS, and each of the faculties represented in the calendar. They traditionally needed months of lead-time to ensure that all proofreading and corrections could be done in time for printing. They used to send the copy to the typesetter in January to have the calendar ready for June distribution. Corrections and revisions made after January (the 80 to 90 departments and subdepartments would usually have many corrections) were difficult to make and cost SGS several thousand dollars each year.

Using PageMaker on the microcomputer, the copy is now prepared by SGS' staff. The calendar is the responsibility of Vice-Dean Rose Sheinin, and Bernadette Lonergan oversees the production. Bernadette reports that while SGS took on this new work, no new staff were actually required to accommodate the increased load. Bernadette also explains that preparing the calendar is not a tedious task, but is "kind of fun", and very easy to learn. By doing the work themselves, they also gain autonomy in the later stages. Now they can make revisions until late April — thus gaining over three months of production time.

Their Process

To prepare the calendar, Bernadette had the typesetter put the last year's calendar on computer disks. She could then convert the text into Microsoft Word files for editing. Creating about 90 PageMaker files (one for each department), she placed the appropriate text into PageMaker. When finished, the entire calendar used less than 10 megabytes of disk space. To prepare the camera-

PageMaker 3.0 Preview

PageMaker 3.0 for Macintosh computers, the next version after 2.0a, is now available. A demonstration disk highlighting 3.0's new capabilities is already available, and judging from this demo, the new version will be a more versatile product in several ways. I also had a chance to use a beta version of 3.0 (beta versions are prereleases of products that are still in the development stage) and was quite impressed with 3.0's new abilities. The five major additions are as follows:

1) **Autoflow** in 3.0 automatically places up to 128 pages of text. This should answer the complaint that PageMaker is too labour-intensive with long documents. Autoflow will prevent the tedious pasting up of each page in repetitive formats as found, for example, in a book.

2) **Textwrap** hugely enhances PageMaker's handling of text with graphics, automatically flowing text around artwork. Move the graphic anywhere on the page and the text immediately flows around it. You can also adjust the boundary image of the graphic, so that the text will then flow around curved and odd-shaped artwork. Textwrap will save a lot of work over previous PageMaker methods of incorporating text and artwork.

3) **Style Sheet** makes possible the creation of consistent style-attributes. You can define all chapter headings, for example, to have certain characteristics. Then each chapter heading will be altered when the style-setting is changed.

4) **Image Control** allows alteration of scanned images. Contrast and brightness can be adjusted, and special effects can be added to the image.

5) **Color** adds the ability to prepare documents for colour printing. You "tag" different items on your page as different colours. While your printed output is still black and white, PageMaker prints the tagged areas as separate overlays with highly accurate crop marks and registration marks (for exact alignment). Then your work can be sent out for offset colour printing.

In summary, Aldus seems to have added some useful abilities to PageMaker. UTCS has ordered a copy, and *ComputerNews* will provide a product review. For more information about PageMaker, call Pat Hood at 978-4548, or Vera Petraschkewych at 978-6050.

ready copy, which will be sent to press, SGS will use an Apple LaserWriter Plus printer with high quality printer paper.

One problem Bernadette has found with PageMaker on an IBM clone is the lack of character support for certain foreign languages. French, Spanish, and German accents are provided, but for Slavic and Asian languages, no special characters are available. (On the Macintosh, this is less of a problem since foreign language fonts can be installed.)

While neither an AT clone nor a LaserWriter Plus is inexpensive (nor is PageMaker software, for that matter), Bernadette estimates that their system will pay for itself in eighteen months. SGS' experience with desktop publishing clearly shows why this new technology is so highly regarded.

ComputerNews

Desktop publishing is widely used on campus today. UTCS is another big user of this new application. *ComputerNews* is entirely composed with PageMaker. Copy for *ComputerNews* used to be produced through UNIX and then pasted up by hand. Today each page is designed and produced in PageMaker and printed out on UTCS' Linotronic PostScript phototypesetter. Not only can painstaking paste-up work be avoided, but new possibilities also exist for incorporating graphics and for improving design.

Nota Bene 3.0

Pat Hood
PHOOD at UTORONTO

Nota Bene 3.0 is now available with a host of new features to delight current users. Most noteworthy is the long awaited spelling checker. Other additions include thesaurus lookup, redlining, improved Help and sorting, inclusion of graphics files and other "print-to-disk" material, font downloading, and screen-width editing.

The Supplemental Languages add-on software is not available for Version 3.0. If you are planning to purchase Nota Bene for work with Hebrew, Cyrillic, Greek, or other languages, you will have to wait until the supplements become available for the newest version of the base software. If you are already using the language supplements software, you should not upgrade your base software at this time.

New Features

The new spelling checker has been highly rated by *PC MAGAZINE*. It allows you to check the spelling of a single word, a block of text, a file, or a series of files. It can be set up to check and/or correct spelling as you type. Up to 15,000 words can be added to the 100,000-word dictionary, and phrase libraries can be included to give what Dragonfly Software calls "electronic shorthand." A thesaurus has also been added, allowing you to display synonyms for a selected word.

To provide variety in documents, a new Include feature allows you to merge a file into a document when printing. Nota Bene files and "print-to-disk" files from other programs can be merged, giving you the option of incorporating graphics or screen images into text.

A number of printing-specific changes have been made. The PrintTypes menu now displays all the fonts available in the active printer table. Font downloading for the Hewlett-Packard LaserJet Plus/Series II has been simplified and improved. Another addition is a function for automatic envelope printing that works intelligently with laser printers.

There are some improvements for text editing as well. The last search or change is remembered, and you can return to the start of the last search. A redlining/blue-pencilling function is a welcome addition for writers, editors, and lawyers. It allows you to record the changes made to a document and selectively incorporate specific changes in the final text.

Hardware Requirements

The major hardware change for Version 3.0 is that the program now requires 512KB of memory (earlier versions required 320KB, 384KB if using Text Base). A hard disk is recommended for using the Speller/Thesaurus. You also need DOS 2.0 or higher. The hardware requirements for the language supplements are much more restrictive.

Pricing

If you do not currently own Nota Bene, you may order it through Ms. Dale Wright in the UTCS Information Centre, 4 Bancroft Avenue, Room 201. The Version 3.0 base package costs $400 when ordered through UTCS. If you already own the software, you must contact Dragonfly Software directly about obtaining your update. The cost is US$50; a new manual and binder are an additional US$35. Updates will be provided to registered users only.

Microsoft Word 4.0 for the IBM PC

Pat Hood
PHOOD at UTORONTO

In the never ending "oneupmanship" of the software market, Microsoft has responded to the phenomenal growth of WordPerfect 4.2 with its own new Microsoft Word Version 4.0. Features such as macros, line drawing, and document summary put Word 4.0 functions on par with WordPerfect 4.2.

Command Menu Enhancements

For long-time Word users, the most obvious change is the abandonment of the Alpha command on the Command menu. Previously, to return to the text window from the Command menu, you had to choose the Alpha command. The new version uses the <Esc> key as a toggle key: pressing it while in the text window takes you to the Command menu; pressing it while in the Command menu takes you to the text window.

Command and field selection has been enhanced by the addition of the cursor keys for moving within the command area. The F1 key replaces the cursor keys for displaying option lists (e.g., filenames, fonts, printers); this greatly simplifies field-option choices. The Tab and Spacebar keys function as in previous versions but can be replaced by the cursor keys and/or alphabetic keys for faster response.

The new functions have been added to the Command menu in appropriate places, but the mnemonic method of accessing commands suffers when a menu has two commands beginning with identical letters. For example, Format sEarch and Format repLace commands have been added to the Format menu, and the upper-case letters "E" and "L" must be used to access the commands because "R" and "S" are used by other commands.

Line Drawing

Word has two new types of line-drawing capabilities. The Format Border command allows you to draw single, double, or bold lines and boxes around paragraphs. This is very useful for boxing tables or enhancing a document with vertical and horizontal lines. In Line Drawing mode, you draw lines and boxes using the cursor keys. On the Options menu, you select the line-drawing characters you wish to use (e.g., single, double, dots, hyphens) before choosing line drawing. Simple organizational charts, drawings, and bar graphs can be made with this feature.

Macros

Macros (stored keystrokes that can be played back to perform a task) are a welcome addition to the package. You can create macros by recording actions as you perform them or by typing all the keynames, commands, text, and instructions you want to store in the macro. A simple macro could create a letter, for example, choosing the margins, font, and font size, and typing and formatting the department address and date. Properly designed macros can perform repetitious tasks flawlessly and efficiently, eliminating error and fatigue, providing consistency, and saving time. Useful sample macros are supplied with the program.

Document Summary

Each document now has a summary sheet attached to it containing information about the document, such as the date of creation and the author's name. You can use information in the summary sheet to locate and retrieve documents. The summary sheet can be printed to give a permanent record of the history of a document.

Spreadsheet Linking

You can now move information from Microsoft Excel, Multiplan, and Lotus 1-2-3 into Word.

Revision Marks

Word's Revision Mark feature (redlining) allows you to mark text inserted and/or deleted in a document. This function is useful in projects involving multiple authors/ editors and in the legal profession.

What's Missing?

The most glaring omission in Version 4.0 is automatic repagination. This function is becoming more widely available in word-processing packages, and many people assume that a market leader such as Microsoft Word has it. The package has kept up with user demands in all areas except this.

UTCS Support

Consulting and instruction in Version 4.0 of Microsoft Word are available at UTCS. The short course "Introduction to Microsoft Word on the IBM" is offered on a continuing basis; please call Irene Rosiecki at 978-4565 for details.

Other Enhancments for Microsoft Word 4.0 for the IBM PC

Enhancements to existing features include:

- Cut-and-paste of text between documents using Microsoft Windows
- Indent key sequences using current tab settings
- New page-break symbol
- Print Merge to document
- Search and replace of formatting, such as bold and italics
- Spell checking of selected text
- Styles (for Style Sheets) created using formatted text as a template
- Table of contents creation from an outline
- Window zoom (small window temporarily takes over entire screen)
- Word count on repagination

Improvements have been made in the following areas:

- Command explanations in command area
- Display customization
- Forms support
- Math functions
- Mouse use
- Number of printers supported
- Outline
- Speed
- Thesaurus
- Video support

Summer Course Schedule!

Irene Rosiecki
Rosiecki at UTORONTO

To find out about registration and course fees, please contact:

UTCS Education Office
4 Bancroft Avenue, Room 217
Phone: 978-4565

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dBASE101 - Introduction to dBASE III Plus
Date: August 29-September 2, 1988
Time: 1:00-4:00 p.m.

DOS101 - Introduction to PC-DOS
Date: June 6-10, 1988
Time: 2:00-4:00 p.m.

Date: August 22-26, 1988
Time: 2:00-4:00 p.m.

LOTUS101 - Introduction to Lotus 1-2-3
Date: June 13-17, 1988
Time: 9:00-12:00 noon

Date: August 29-September 2, 1988
Time: 9:00-12:00 noon

PGMAKE101 - Introduction to PageMaker on the Macintosh
Date: June 20-24, 1988
Time: 2:00-4:00 p.m.

Date: July 25-29, 1988
Time: 1:00-3:00 p.m.

SASPC101 - Introduction to SAS
Date: June 13-17, 1988
Time: 3:00-5:00 p.m.

Date: August 15-19, 1988
Time: 2:00-4:00 p.m.

WORDIBM101 - Introduction to MicroSoft Word on the IBM PC
Date: August 22-26, 1988
Time: 9:00-12:00 noon

WORDMAC101 - Introduction to Microsoft Word on the Macintosh
Date: June 13-17, 1988
Time: 9:00-1:00 p.m. (June 13)
9:00-12:00 noon (14-17)

Date: August 15-19, 1988
Time: 9:00-1:00 p.m. (August 15)
9:00-12:00 noon (16-19)

WRDPERF101 - Introduction to WordPerfect 4.2
Date: June 7, 9, 14, 16, 21
Time: 6:00-9:00 p.m.
EVENING COURSE

Date: July 4-8, 1988
Time: 9:00-12:00 noon

Date: July 18-22, 1988
Time: 9:00-12:00 noon

Date: August 15-19, 1988
Time: 9:00-12:00 noon

PHILIPS NMS 9100 PC

Paul Roth
PROTH at UTORONTO

Following IBM's lead, Philips has introduced a small-footprint machine without sacrificing too much in expandability or performance. The NMS 9100 PC is an 8088-2-based machine with one 720KB 3.5-inch diskette drive and a 20-Megabyte (MB) Miniscribe hard disk installed. Its small size is achieved by placing the serial port, parallel port, floppy disk controller, and RAM banks all on the motherboard (by third quarter 1988, Philips promises surface-mounted technology as well). With all these functions on the motherboard, less power is needed, so Philips has installed an 89-watt power supply. The documentation does not indicate whether the power supply is adaptable to European circuitry, but Philips tells us that the power supply accommodates 220v European circuitry via a switch within the power supply cover and the purchase of a European outlet adapter.

Philips has chosen an **unusual RAM configuration**, which on the surface provides the 640KB needed for MS-DOS. Three banks of 256KB chips are on the motherboard, for a total of 768KB. Because DOS uses only 640KB, the extra 128KB is set up in Philips' default CONFIG.SYS as a RAM drive. It is commendable that Philips decided to go this way rather than put only 512KB RAM on board, as several other manufacturers have done. However, the extra 128KB tends to confuse some software, as discussed below.

The **onboard serial and parallel ports** are a good idea. The serial port, which uses the AT-style 9-pin D-connector, was tested at various speeds, using the U of T version of the popular communications program, **ProComm.** In all cases, once connection was established to a host machine, communications worked well. Terminal emulation and file transfer were tested successfully. An executable file was uploaded to a host machine, and then downloaded to the micro, where it still executed perfectly.

The only problems encountered with the serial port occurred at 2400 bits per second (bps) and 9600 bps, when the machine dropped characters while talking to the UTCS front-end packet-switching network (PACX). This problem appears to involve "autobauding," whereby the remote machine must detect an incoming signal's speed. The problem did not arise at 1200 or 300 bps. In any case, it is a minor problem, and the serial port worked well once the machine was connected to a service.

Manufacturer: Philips Electronics Ltd.

Type: 16-bit MS-DOS

System Unit: 8088-2 CPU, with slot for 8087-2 numeric coprocessor; 768KB RAM standard; 1 serial port; 1 parallel port; 5 expansion slots, one of which is used by the display adapter card; 4.77 or 8 MHz switchable clock speed with 0 wait states; socket for TTL monitor plug; On/Off switch on front; clock/calendar.

Keyboard: 83-key IBM PC layout, with large indicator lights for "Caps Lock" and "NumLock"; fairly small "Enter" key; no separate "Enter" key on numeric keypad; lightweight design. 101-key AT-style keyboard optional for extra cost.

Monitor: Philips "Computer Monitor 80" TTL monochrome is standard (amber on black background); monitor plugs into monitor outlet on rear of system unit; contrast and brightness within easy reach of operator on front of monitor.

Disk Drives: One 3.5" 720KB floppy drive, plus one 20MB internal hard disk, 5.25" 360KB floppy drive optional.

Physical Description: 5.5"H, 14.25"W, 15.5"L; approximately 22 lbs.; access to inside of machine: 2 screws on the back panel and 4 screws on bottom of system unit; metal casing.

Warranty: One year, parts and labour, carry-in (depot).

Compatibility Level: 9x%.

Bundled Software: MS-DOS Version 3.21; GW-BASIC Version 3.11.

Documentation Provided: *NMS 9100 User Guide,* which serves as the MS-DOS manual as well.

Our testing was done with and without the **XON/XOFF driver** provided by Philips. This driver should prove extremely useful for connecting to serial printers, including the Apple LaserWriter, when used with software that creates PostScript output. The inclusion of the XON/XOFF driver as part of Philips' MS-DOS is laudable.

A number of **benchmarking tests** were run. The Miniscribe hard disk produced an average access time of 72.5 milliseconds, faster than the IBM XT but slower than some other standard hard disks. The data transfer rate, using an interleave of 4, measured about 115KB per second, not particularly fast. The machine's general performance index, measured against the IBM PC's value of 1.0, rated at 1.7, typical of a "turbo" machine.

An interesting feature is the **arrangement of the disk drives** inside the system unit. Seen from the outside, the machine we reviewed had two drive bays, each capable of handling a 5.25-inch half-height device, although the uppermost drive (Drive A:) in fact had a 720KB 3.5-inch floppy drive. Inside, however, to the left of the two bays, was a vertically mounted Miniscribe 20MB 3.5-inch hard disk. Philips tells us that with this arrangement, you could optionally set up a 3.5-inch floppy drive, a 5.25-inch floppy drive, and a 3.5-inch hard disk (or one floppy and two hard disks). This ability to have one of each type of floppy drive could be useful for many people, especially over the next year as the industry slowly migrates to 3.5-inch floppies.

Software compatibility on the NMS 9100 appears fine. The standard packages (e.g., Lotus 1-2-3, WordPerfect) and utilities we tried all ran normally, as did a number of public-domain programs.

Philips has modified its MS-DOS to provide a few value-added features, such as the XON/XOFF driver already mentioned; the most significant of these is the **Help system**. When you press <Alt><F10>, the right half of the screen shows a window that essentially provides an online DOS manual. It is somewhat context-sensitive; for example, if the last thing you entered at the DOS prompt was a DOS command, you will see Help for that command. For novices especially, this may be handy. We should also mention that although the Help system is constantly available in memory, it did not appear to have a negative effect on software compatibility.

The content of the Help system seems reasonably well thought out. For instance, the Help for the DOS command RECOVER warns that this should be used only in emergencies since it will destroy your Directory, something IBM manuals neglect to emphasize.

Hardware compatibility on the other hand may present a problem for some prospective buyers of this machine. The system unit contains five expansion slots, generous enough for a small-footprint machine. Even with one slot used for the display adapter, the average user should not run out of slots. One unusual feature was the amount of room allowed for these slots: full-length cards will fit, but you may have to remove the plastic slot-guides to fit some boards (as we did for testing the IBM Token Ring Network adapter).

The machine uses an 8088-2 microprocessor with the option of running at 4.77 or 8 MHz, with no wait states. Philips has provided two ways of switching speeds. One is by using Philips' SPEED.COM program, which switches easily from "standard" speed to "turbo" speed. The other is by entering <Alt><LeftShift><RightShift> on the keyboard. These methods worked well for switching speeds, but no facility is provided for switching the number of wait states.

Wait states are sometimes necessary for use with device drivers for add-on expansion boards. In our tests, we found that the NMS 9100 could not be used on an IBM Token Ring Network (running Novell NetWare) when the machine was in its higher speed, turbo mode; we think that the inability to introduce a wait state contributed to this. In fact, because of the installed 768KB, getting onto the network at the 4.77 MHz speed was difficult: the Philips documentation gives no information to help determine which memory address to use when accessing the IBM Token Ring Adapter board.

Philips Technical Services, to their credit, reacted well when informed of these problems. They provided us with the technical details we needed to access the Token Ring board properly. Despite considerable effort, however, they were unable to find a way to get the Token Ring board to work at 8 MHz; they are still working on the problem.

All of this means that using the machine in laboratories or offices where networking might be considered **limits your choices of network alternatives**. Of course, for home use, this is not significant.

Another test we did for board compatibility was with the **Bernoulli Box**. This device provides two 20MB removable cartridges, each a hard disk with reasonable access speed (55 milliseconds average access time). To connect the Bernoulli Box to a PC, an interface card must be in an expansion slot and a program called RCD.SYS accessed from CONFIG.SYS at bootup. The NMS 9100 worked fine with the Bernoulli Box, with two exceptions. No matter how we set the switches on the interface card, we could not set it up so that the machine could be booted from the Bernoulli Box. This is not a *necessary* feature, but most machines can do this with no problem, and it might occasionally be useful to Bernoulli Box users. The other problem was that even when we specified LASTDRIVE=E in CONFIG.SYS, the Bernoulli Box came up as Drive D:, i.e., it assigns the next *physical* device letter to the Bernoulli Box. Again, this would probably be a minor inconvenience to most users.

The NMS 9100 did work well with a Centram Systems' **TOPS PC** board. This expansion card, with device driver software, allows you to connect a PC to an AppleTalk network, e.g., to Macintoshes and Apple LaserWriter printers. When referencing the device driver, we set DMA=NONE in CONFIG.SYS; communications were established, and transfers back and forth to Macintoshes were done flawlessly. The only complaint here was that the NMS 9100 manual gave no clues at all as to how DMA was used or what interrupts the machine uses (this technical information is available separately from Philips), which might have made it easier to determine the correct parameters for the AppleTalk device driver. Still, the machine passes the TOPS test with flying colours.

Another test, which the NMS 9100 passed easily, involved using **ATI's VIP** display adapter with an IBM analog monitor, using the VGA mode (a step above EGA). This worked well first time and provided excellent screen resolution.

The **monitor** provided with the NMS 9100 is the Philips Computer Monitor 80, a TTL monochrome amber screen. Its resolution in Hercules mode is fine and pleasing to the eye, although some combinations of brightness and contrast seem to be a bit difficult to get just right. For the most part , the monitor presented no problem during testing, although we should add that its construction seems a little flimsy.

An **ATI Graphics Solution** display adapter card is used as standard equipment on the NMS 9100. This Canadian-made card is very popular and performs well. Philips has even documented its use in the Philips manual itself, indicating a total commitment to ATI. The ATI card is an excellent choice, for it allows an RGB, composite, EGA, or TTL monitor to be used in MDA, CGA, or Hercules mode. The software provided includes drivers for setting up the card for particular software packages in higher resolution modes (e.g., for Lotus in 132-column mode). By using the ATI card, you can substitute an RGB (colour) monitor for the standard TTL monitor without buying a new adapter card, giving you a certain measure of useful flexibility.

Optionally you may use a Philips EGA monitor with the ATI EGA Wonder card, instead of the TTL monitor and ATI Graphics Solution card. Though we did not test this, we believe it would present no compatibility problems whatsoever, especially in light of the monitor's success using ATI's other cards. Of course, this option would cost more.

The NMS 9100 PC, being what is commonly called a turbo XT compatible, thus appears to be aimed at the home market. An unusual feature, then, is the awkwardness of removing and replacing the system unit's metal cover. Six screws are used, including four on the *bottom*, so that you must tilt the machine on its side to have access to them. The manual strongly recommends parking the hard disk before removing the cover, since the hard disk will likely be jostled. Although we removed the cover several times, we never lost the contents of the hard disk, but the whole process is awkward and unpleasant. After removing the screws, you slide the system unit contents out of the casing, which is itself like a four-sided sleeve. Replacing the system unit is also clumsy and results in more jostling. The screws never seemed to be positioned properly when we were replacing the cover, even though this was a fairly new unit. All in all, we rate "cover design" as pretty awful, especially for a home machine.

Documentation, consisting of a *User Guide*, includes some technical hardware details, an MS-DOS manual, and a Quick-Reference GWBASIC appendix. The manual, an undersized spiral-bound volume with hard plastic cover, deals with Philips' MS-DOS well but omits or skimps on details of Philips hardware. As mentioned above, documentation of the ATI card is a plus. GWBASIC is barely treated at all; a new BASIC user will need a separate BASIC manual. Still, compared to clones, which often provide no manual at all, the documentation is worthwhile.

Summary

The NMS 9100 PC has advantages and disadvantages. It allows three drives of any size, while retaining a small footprint. Software compatibility for major packages seems fine, and the MS-DOS provided has a few value-added features that should benefit the average user. The ATI card is a solid choice for a display adapter, offering well-documented flexibility. An intangible benefit is the support available from Philips, a large company that appears to have the resources to stand behind the machine. On the negative side, hardware compatibility in terms of expansion boards, needs improvement. Networking this machine may present problems.

Overall, especially for the home market, the NMS 9100 provides satisfactory value.

A Macintosh Communication Program — Free!

Alicia Damley
DAMLEY at UTORONTO

Looking for a communications package for the Macintosh? UTCS is now distributing MacKermit Version 0.8(35).

Kermit, available for various mainframes and micros, is a commonly used file-transfer protocol and communications program. Developed at Columbia University, the program has been made available to interested users free of charge. It is currently a Class B product at UTCS.

MacKermit supports many of the capabilities found in other Kermit programs. These include binary and text file transfers, filename collision avoidance, facility to transmit a BREAK, change of communication settings, and local and remote (in server mode only) operation. In MacKermit, the supported terminal emulation is either VT100 or VT102.

Written to conform to the Macintosh interface and operating system, the program differs from other Kermit versions. For example, VT52 terminal emulation is not available, desk accessories may be invoked while in the program, and the program window has a drag bar that allows it to be moved to one side to reveal other windows.

In addition, MacKermit supports four major pull-down menus: File, Settings, Remote, and Transfer. The File menu includes the file-transfer functions Send and Receive, the Save and Restore functions for the Settings file, and the Quit option. During a file transfer, an emergency exit (<Command><.>) is provided to abort the protocol. Under the Settings menu, dialog boxes are provided which set file (e.g., text or binary, data or resource fork), communications (up to 57.6K baud, parity), and protocol settings (packet length, handshake).

MacKermit also supports Kermit's server function. The Remote menu offers the various server commands that

continued on page 38.

MacPaint Version 2.0 from CLARIS Software

Jon Alexander
JON at UTORONTO

Last month we mentioned the Macintosh software upgrades announced at the recent MacWorld Expo by CLARIS, the new company formed by Apple Computer. According to Pat Maloney, Sales and Marketing Manager for CLARIS Canada, Apple needed to get out of the field of software development and production to concentrate resources on enhancing its hardware products and to avoid conflict with other Apple software producers. "We wanted to have a company that could focus primarily on software for the Macintosh environment." The UTCS Apple Research Partnership Program (ARPP) office has now received a copy of MacPaint 2.0, the first of the new products expected from this company.

The program has a range of new features and changes that set it apart from the previous version of MacPaint. The ARPP staff have a copy of the new version on their Macintosh II computer; you can see the program and evaluate it by contacting the Advising Office at 978-HELP, 10 a.m. to 6 p.m. weekdays, and asking for an appointment to see a demonstration. Look for more information on the new CLARIS line in upcoming issues of *ComputerNews*.

New Features of MacPaint 2.0

MENU	OPTION
File	**Take Snapshot** - creates a special saved version (**snapshot**) of the current file. **Throw Away Snapshot** - discards **snapshot** of file.
Edit	**Revert to Snapshot** - allows user to revert easily to previous **snapshot** version of file.
Goodies	**Show Mouse Position** - shows an absolute position and a relative-to-start-of-draw displacement in a window or inset. **Draw From Center** - sets drawing tools so that any closed shapes drawn with the Tools menu tools in this mode are centred on the point from which they are dragged. The default is Draw From Edge, which was the only mode possible in previous versions of MacPaint. **Shortcuts...** - displays a box that lists all the keyboard shortcuts for MacPaint. **Preferences...** - lets you set the preferences for various options in MacPaint (e.g., grid- measurement units).
Tools	is now a pull-down menu that can also be used as a tear-off menu. Draw-from-center on shape-drawing tools (see above, **Goodies** menu). "Magic eraser" option on eraser-tool with <Command> <click> - lets you restore all or part of an erased area to the most recent **snapshot** (see above, **File** and **Edit** menus).
Patterns	is now a pull-down menu that can also be used as a tear-off menu.

A Macintosh Communication Program continued.

can be sent to the Kermit server or chosen to put the Macintosh Kermit in server mode.

MacKermit's terminal emulation is a subset of the features of the VT102 terminal. Some of the VT102 features not supported include: double-height or double-width lines, smooth scrolling, and 132-column mode.

Included with this version of MacKermit is CKMKEY, a separate program allowing keyboard configuration. Individual keys may be redefined to other keys or multicharacter function keys. A special key sequence may also be used to send a long or short BREAK. The program can also modify the Option, Command (Apple), and Caps Lock keys to act as a Control key or another Caps Lock key. In addition, one or all of these keys may be used as a Meta key. In MacKermit, a Meta key may be a prefix that you define or a key that turns on the eighth bit, thereby sending ASCII characters 129 to 256.

If you would like a copy of MacKermit, simply bring a single 3.5-inch floppy to the Advising Office (4 Bancroft Avenue, Room 201) between 10 a.m. and 6 p.m., Monday through Friday. You will receive a copy of the program, the keyboard-definition program, two keyboard-definition settings, and a document outlining the keyboard mapping.

New Version of WATFOR-77/PC

Alicia Damley
DAMLEY at UTORONTO

A new version of the WATFOR-77/PC FORTRAN compiler is now available. This article outlines the enhancements and changes in this new version of WATFOR-77/PC, WATCOM GKS Library and the WATCOM Editor. (See for information on licensing this product from UTCS.)

Changes to WATFOR-77/PC

- Three new options have been added to the compiler.
  - ARRAYCHECK/NOARRAYCHECK provides type checking on array arguments. Both the previous and new versions of the compiler will flag the condition where a REAL type array is passed to an INTEGER type array. However, if you wanted to share array storage for data of different types, the NOARRAYCHECK option would allow this. The previous version did not include this feature. This option may be placed in the source enclosing the calling statement or in the options list on the command line along with the array name. Note, the functionality of the NOARRAYCHECK option is not supported by the FORTRAN-77 standard.
  - The EDIT/NOEDIT option controls the editor interface to WATFOR-77. Previously, the editor was included only by selecting it in the configuration procedure. Now, loading the editor can also be done as an option. In addition, the editor is invoked as a separate task and no longer shares the same dynamic memory as the compiler, making more dynamic memory available to the compiler.
  - The "NO" prefix of the PRINT and TYPE options has been replaced with three individual options — DISK, PRINT, and TYPE — which now specify the destination of the listing file.

Unlike previous versions, the various compiler options specified on the DOS command line will remain in effect for the rest of the WATFOR-77 session.

- A default LIBRARY string parameter has been added to the configuration menu. This may be used to specify the default library for every session. However, it can be overridden with the DOS SET command using the LIBRARY environment variable.

- The INCLUDE option can no longer be used to continue statements across the boundaries of included files.

- To reduce the size of EXE files, arrays are now allocated dynamically at the start of execution. For example, consider a program that declares a one dimensional array of size 10000. The executable size of this program created using the new version of WATFOR-77 is almost 40KB smaller than that of the current version. Expanding the array to a two dimensional 250 by 250 array in the same program yields a size difference of approximately 248KB! In fact, the sizes of the two executables created using the new compiler differ by a mere 44 *bytes!*

- The WATFOR.LIB library file has been expanded to include several new functions.

    - The INTEGER function, DOSENV, allows an application to obtain the value of a DOS environment string from within an executing WATFOR-77 program.

    - The INTEGER function, FORK, allows an application to run another DOS application/ program. The second application runs from within the WATFOR-77 program's execution. Use of this function requires the additional code of the EXDOS.FOR program found on the WATFOR-77 diskette.

    - The above functions require DOS Version 3.0 or higher. Similarly, the INTEGER function, PARM, previously found in the WATFOR.LIB library file now also requires DOS 3.0 or higher.

- The IMPLICIT NONE statement was added in Version 1.5 but remained undocumented. This extension of FORTRAN-77 is very useful in detecting variables that have been used but not declared. It requires that each variable used must have a corresponding type declaration and can be very useful when debugging a program. Also, starting in Version 1.5, the underscore character (_) was supported as a valid character in symbol names.

Changes to the WATCOM GKS Library

- WATCOM GKS has been enhanced to include support for the graphics modes of the IBM PS/2 and for drawing high-quality text. Thus, there are now up to 15 choices from which to select the graphics mode done using the INIT subroutine. These include CGA, EGA, and VGA modes.

Attention All UTCS license holders:

The annual UTCS license expires June 30, 1988!

To those who are already registered users, UTCS will be mailing out a License Renewal Contract by the first week of June. If you have not received your contract or if you are a University member who is interested in licensing products from UTCS, please contact Irene Rosiecki at 978-4565.

- In order to improve the speed of WATCOM's GKS, its executable code has now been provided as a separate executable program. This must be run before GKS is used and remains memory-resident. In addition, the GKS library, WGKS.LIB, is smaller, consisting of small programs that request the memory-resident GKS to perform various tasks. By placing GKS into memory and by decreasing the size of the library file, overall GKS application development time is expected to decrease.

- The FORTRAN source code has been included for subroutines in WGKS.LIB (in the INTRFACE subdirectory of the GKS Library diskette). Source has been made available to allow you to perform argument type checking. WATFOR-77 attempts to locate and compile source code for a missing subprogram before loading the corresponding object file. The search path is specified in the DOS "SET LIBRARY" command.

Changes to the WATCOM Editor

- The Editor can now handle a maximum record length of 253 characters (up from 134). Variable numbers of screen rows are now supported with EGA/VGA adapters and the editing window is adjusted accordingly.

- When the Editor looks for a specified filename, the search is now case-insensitive. Previously, "edit x" and "edit X" would have created two workspaces with different names.

If you have any questions regarding WATFOR-77/ PC, please feel free to call Advising Services at 978-HELP.

What's New on the BBS?

Alicia Damley   DAMLEY at UTORONTO
Dariuz Dabek   DABEK at UTORONTO

Many useful programs and utilities can be found on the UTCS Bulletin Board System (BBS) for the IBM/clones, Macintosh, Apple, Atari, and Amiga. Some of the latest offerings for the IBM/clones include:

Program Name/Function	BBS filename(s)
ProComm Plus - Test Drive V1.1	PPLUS11E., PPLUS11D., PPLUS11M.ARC, PPLUSA.ARC
ProFonEdit+ - Phone Directory Processor for ProComm Plus	PFE-PLUS.ARC
PICNIX (UNIX) utilities	PIXNIXF1., PIXNIXF2., PIXNIXF3.ARC
PibTerm V4.11	PIBT411A., PIBT411B., PIBT411C., PIBT411D.ARC
Turbo C Debugger	TCDEBUG.ARC
Flushot+ - latest virus protection	FSP.ARC
Directory Control	DC103E.ARC
Matrix Calculator	MONKEY.ARC
Grade Calculator for Teachers	GRADE326.ARC
Uuencode/Uudecode for PC	UU.ARC
UNIX-like tail command	TAIL.ARC
UNIX-like split command	SPLIT.ARC
UNIX-like less filter	TCLESS.ARC
Listing of DOS interrupts	INTERRUP.ARC
Enchanted Castle	EC2.ARC

The Macintosh file area is currently small but is growing quickly. Recent additions for the Macintosh include several interesting HyperCard stacks.

Scrolling list management	DOLIST
Create your own About ... box	ABOUT
Resource copy, like Font/DA mover	RESCOPY
Assorted XCMDs	NOTESLOG
Create Pop Up Menus in HyperCard	POPUPMENU

Other files consist of electronic virus protection utilities, MacPaint documents of various subjects, and assorted games.

BBS membership is free to any member of the University community. To become a member, call the BBS at 978-7239 (2400 baud), 978-3959 (1200 baud), or 978-6200 (300 baud) and request SERVICE or CLASS "BBS". On your first call, you will be asked to leave your name, a phone number, and your affiliation with the University. By the following afternoon (following verification of your association with the University), you will be included in the users list and have full access to the Bulletin Board.

We invite you to sign on and enjoy!

Change Committee

Beverly Scarborough
BEVS at UTORONTO

Changes to Academic VM/CMS Machine Services

1. WATFOR-77 was upgraded to Version 2.5 as "NEW" (March 11).
2. Waterloo C Version 3.0 was installed as "NEW" (March 21).
3. Rice Mailbook Program was upgraded (April 20).
4. CMS Mailer was updated from Version 1.23B to 1.25 (March 28).
5. NTSYS (1987 Version) on CMS was installed (April 4).

Changes to Other Systems and Services

1. TN 3270 on GP UNIX was upgraded to a new release (March 11).
2. DECNET Mail on LASH was upgraded to allow multiple mail addresses (April 11).
3. A one hour timeout was introduced on GP UNIX (May 2).

Personnel Changes

William Barek, with UTCS for seven years, remains Site Coordinator at Scarborough College, but is now a College staff member.

Allen Ng, also at UTCS for seven years, has left us for a position in government.

Bruce Pinn and **Dr. Edmund West** are now on staff at the Ontario Centre for Large Scale Computation.

ProComm Communications Program Seminar

July 15, 1988
10:00-12:00 noon

ProComm is a general purpose communications program currently available to all U of T faculty, staff, and students. It is the resident communications program in the IBM Education Facility.

A seminar has been scheduled to introduce ProComm and its various features: terminal emulation (a number of popular ones will be reviewed); the dialing directory; file transfer protocols, such as Kermit and XMODEM; configuration and modem parameter settings; and the DOS gateway, which allows you to execute DOS commands and other programs while you are still in ProComm.

A course fee is attached to this seminar. Copies of ProComm are made available at no charge to members of the University, but you must bring your own diskettes (two 5.25" or one 3.5").

To reserve a place in this seminar, please contact Irene Rosiecki at 978-4565.

Free NetNorth (Electronic Mail) Demonstration

July 15, 1988
12:00-1:30 p.m.

Anyone interested in sending documents to colleagues or friends reliably, quickly, and inexpensively will not want to miss this demonstration. We will introduce you to the NetNorth/BITNET/EARN communications network, which is accessible from the CMS system. This network connects more than a thousand universities and research institutes in Europe, Asia, and North America. Sending documents or files over the network is very easy to learn.

The demonstration will last just over an hour. Included will be how to send mail and files to another institution, and how to talk directly to someone on the network. ***Please note this is a demonstration only.***

Space is limited. If you would like to attend one of these sessions, please contact Irene Rosiecki at 978-4565 to reserve a place.

Documents at UTCS

All vendor-produced documentation may be ordered through the UTCS Information Office, Room 206, Engineering Annex. UTCS documents and selected vendor documents are also stocked there for purchase. For more information on prices, call Dale Wright at 978-4990. Whenever feasible, documents are made available online, and users are encouraged to print their own copies. On the VM machine, a special command has been provided for this purpose

To print online documents on:

IBM VM/CMS	**GP UNIX**
Type "help document"	Use *ipr* command

In these examples, the document to be printed is the UTCS Guide to Census Tapes (LISTING=CENSUS).
<RETURN> means RETURN or ENTER key.

CMS:	document <RETURN> <RETURN> laser census listing (forms yxle <RETURN>
GP UNIX:	nohup ipr -8p -fyxle /usr/doc/utcs/census & <RETURN>

UTCS Documents in hardcopy:

New:

Previously announced:

Academic's Guide to Microcomputer Systems
Character Sets for Highspeed Printing
UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction
UTCS GUIDE TO PRODUCTS AND SERVICES: Basics
UTCS GUIDE TO PRODUCTS AND SERVICES: Accounting
UTCS Catalogue: Numerical Products
UTCS Catalogue: Statistics Products
UTCS Catalogue: Text Products
UTCS Guide to Census Tapes
UTCS Guide to Kermit
UTCS Guide to Micro File Transfer Service
UTCS Guide to Text Processing on GP UNIX

UTCS Documents online	**CMS LISTING**	**GP UNIX**	**Forms Code**
New:			
UTCS Guide to FORTRAN on VM/CMS	FORTRAN		*
Previously announced:			
UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction	INTRO	/usr/doc/utcs/intro	*
UTCS GUIDE TO PRODUCTS AND SERVICES: Basics	BASICS	/usr/doc/utcs/basics	*
UTCS Catalogue: Access, Part 1	ACCESS1	/usr/doc/utcs/access1	*
UTCS Catalogue: Access, Part 2		/usr/doc/utcs/access2	*
UTCS Catalogue: Numerical Products	NUMCAT		*
Product-Function List	NUMLIST		BXQD
UTCS Catalogue: Statistics Products	STATCAT		*
Product-Function List	STATLIST		BXQD
UTCS Catalogue: Text Products	TEXTCAT	/usr/doc/utcs/textcat	*
UTCS Guide to BMDP	BMDP		*
UTCS Guide to Census Tapes	CENSUS	/usr/doc/utcs/census	*
Recipes for Using Tapes on VM/CMS	QUIKTAPE		*
UTCS Guide to GP UNIX		/usr/doc/utcs/gpunix	*
UTCS Guide to Highspeed Printing	PRINT	/usr/doc/utcs/print	*

* *Recommended forms code for the 8700 is YXLE unless otherwise stated.*
Use the 87set command. Type "help 87set".

Documents continued

UTCS Documents online	CMS LISTING	GP UNIX	Forms Code
UTCS Guide to Kermit	KERMIT	/usr/doc/utcs/kermit	*
UTCS Guide to Micro File Transfer Service	MICROXFR		*
UTCS Guide to Micro Laser Printing	MICRLASR		*
UTCS Guide to SAS	SAS		*
UTCS Guide to SCRIBE	SCRIBE		*
(For printing instructions, see page 1 of document)			
UTCS Guide to Series/1 Terminal Use	SERIES		*
3270 Emulation:			
Cybernex APL100 and Volker Craig VC404	CYBER		*
DM1520	DM1520		*
Hardcopy Terminal	HARDCOPY		*
IBM 3101	IBM3101		*
IBM PC Kermit	PCKERMIT		*
SOROC IO	SOROC		*
VT52	VT52		*
VT100	VT100		*
UTCS Guide to SPSS	SPSS		*
UTCS Guide to Text Processing on GP UNIX		/usr/doc/utcs/text	YXOG
UTCS Guide to TFW.MAK in SCRIBE	TFWMAK		*
UTCS Guide to VM/CMS	CMSGD		*
UTCS Guide to WSCRIPT	WSCRIPT		*
UTCS Rate Schedule (Commercial)	RATESCOM		†
UTCS Rate Schedule (External)	RATESEXT		†
UTCS Rate Schedule (Internal)	RATESINT		†
Other Documentation online			
Kermit			
Kermit Protocol Manual	KERMITPM		YXOE
Kermit User Guide	KERMITUG		YXOF
ProComm			
ProComm Reference Manual	PROCOMM		YXOE
VM Tape Documents			
TapeMap User's Guide and Reference	TAPEMAP		*
VMTAPE Messages and Codes	VMTMSGS		YXOE
VMTAPE User's Guide	VMTUSER		YXOE
VMSECURE			
VMSECURE User's Guide	VMSECURE		YXOE
Waterloo SCRIPT			
Reference Manual	WSCRPTRF		YXLC
User's Guide	WSCRPTUG		YXLC
Using SCRIPT in MVS/TSO	WSCRPTSO		YXLC
Waterloo SCRIPT and a PostScript Printer	WSCRPTPS		YXLC
Formula Processor Summary	WSCRPTFP		YXLC
GML User's Guide	GMLUG		YXLC
GML Reference Summary	GMLRFSUM		YXLC
OBS WYLBUR			
Messages and Codes			YXLD
Qwik Files			YXLD
Reference Summary			YXLG
Reference Manual			YXLD
7.0 Release Guide			YXLC
User Guide			YXLD
Electronic Mail			
A User's Guide to Electronic MAIL	MAILBOOK		YXOC

** Recommended forms code for the 8700 is YXLE unless otherwise stated.*
† *Use the 87set command. Type "help 87set".*

Consulting and Enquiries

Applications Support & Advising Supervisor	Alex Nishri	BC214	978-7109
External Marketing Consultant	Ihor Prociuk	BC217	978-6875
Erindale College	Joe Lim	ER2035	828-5311
Information Office	Dale Wright	BC201	978-4990
Account & Access Code Enquiries (U of T)	Christine Gray	BC101B	978-8703
Account & Access Code Enquiries (External)	Sylvia May	BC101B	978-7148
IBM PC Maintenance	Kam Mark	BC103	978-5050
Tape Library (Academic Services)	Richard Foster	MP368	978-7319
Tape Library (Administrative Services)	Miranda Fong	MP368	978-6693
Terminal Service	Rosi Tseu	BC105	978-3787
UTCS Noncredit Short Courses	Irene Rosiecki	BC217	978-4565

Consulting & Advising Services:	978-HELP
CMS, and GP UNIX userids:	ADVISOR
CMS Userid for mail problems:	POSTMSTR
System Status Enquiries (GP UNIX)	978-4318
System Status Enquiries (IBM)	978-7393
Interactive Services 300 (bps)	978-6200
Interactive Services 1200 (bps)	978-3959
Interactive Services 2400 (bps)	978-7239
Datapac	4320 0056
Telnet	0302043200056
Tymnet	<backspace>DPAC;302043200056

UTCS Directory

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Committee on Administrative Computing	Chair	Janice Oliver	978-4322	
UTCS Board	Chair	Prof. D.M. Nowlan	978-4984	NOWLAN at UTORONTO *
Supercompter Users' Group at U of T	Chair	Prof. P.P. Kronberg	978-4971	

Legend

BC = Bancroft Building
ER = Erindale
MP = McLennan Physical Labs

* NetNorth/BITNET/EARN

UTCS Terminal and Advising Sites

Names and Locations

Central Advising Office (CAO), 978-HELP
Engineering Annex (EA, CDF), 11 King's College Road, Rooms 103, 107, 107B, 201, 203
Erindale College (Erin), 828-5339, Mississauga Road, Erindale Campus, Rooms 2037, 2039A-B-C, 2045
Robarts, Robarts Library, 130 St. George St., Room 1061A
Sidney Smith (Sidney), 100 St. George St., Rooms 1071, 2105
St.Michael's College, 121 St. Joseph St., Room 107
Trinity College, 6 Hoskins Ave., Room 024
Victoria University, 73 Queens Park Cres., Room 208

Sites	Hours of Access				Restrictions*	Advising
	Mon-Thurs	Fri	Sat	Sun		
CAO	10:00-18:00	10:00-18:00	closed	closed	Research	978-HELP
CDF	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	No
EA	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Erin (2039) □	9:00-17:00	9:00-17:00	closed	closed	Research	Rm 2005
(2045-46-47)	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	Rm 2005
(235)†	8:00-22:00	8:00-17:00	closed	closed	None	Rm 2046
Robarts	8:30-24:00	8:30-24:00	9:00-22:00	13:00-22:00	None	978-HELP for Research
Sidney	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	None	978-HELP for Research
St.Michael's	Closed for the summer.					
Trinity	Closed for the summer.					
Victoria	Closed for the summer.					

Legend

* Research includes graduates, faculty, staff.
□ Key access available.
† Access restricted to building hours.

Advising Hours

CAO	Monday through Friday, 10:00 - 18:00
Erin	Monday through Friday, 09:00 - 17:00

Sites	PACX	Network Terminal Server	CMS Only	Printers Terminals	CDF/PC
CDF	Y	N	N	Y	N
EA	N	Y	N	Y	N
Erin	Y	Y	N	Y	N
Robarts	Y	N	N	Y	Y
Sidney	N	Y	N	Y	Y
St.Michael's	Y	N	N	Y	Y
Trinity	N	N	Y	Y	Y
Victoria	Y	N	N	Y	Y

(Y=yes, N=no)

UTCS Services

UTCS Centrally Owned and Managed

Systems

IBM VM/CMS

- General Purpose Timesharing; access to NetNorth, BITNET, and EARN networks; access to CRAY X-MP/22
- 4381-R14 processor, 32 megabytes of memory
- CP operating system, VM/SP HPO R4.2
- CMS timesharing system, VM/SP Release 4
- RSCS spooling system, Release 3
- CRAY station Release 4

GP UNIX
Technical Assistance: 978-8853

- General Purpose Timesharing under SUN UNIX 3.2
- SUN 3/280, 8 megabytes of memory
- access to Linotronic typesetter
- offers a sophisticated and powerful environment for text processing
- offers a sophisticated programming environment suitable for commercial software development or testing
- full access to USENET, an electronic technical information exchange facility
- offers excellent electronic mail facilities and ability to send or receive mail from most computer networks worldwide, such as UUCPNET, ARPANET, NetNorth, BITNET, CSNET, CDNNET

Services

Communications & Technical Support
Primary Phones: 978-3787, 978-4967

- Communications Group provides communications systems, terminals, modems, data channels: consulting and installation.
- Field Service Group installs and maintains communications and computer systems, particularly IBM PCs and Micro Vaxes, on a contract basis or on a cost-per-call basis.
- provides consulting on computer systems technology and installs computer systems
- provides access between the IBM systems and machines using UNIX, VMS and other operating systems. Ethernet, Pronet, and IBM TRN technologies are used over various transmission media including optical fibre. More basic communications techniques are also used for moderate speed links.
- provides consulting on local area networking and installs LANS
- provides access to NetNorth (BITNET), the North American Universities Network; and USENET, the UNIX networking fraternity
- will provide a communications solution to department needs on a contractual basis

Information Centre
Primary Phone: 978-HELP

- Provides assistance in use of electronic messaging, including use of Local Area Networks (LANS); NetNorth/BITNET/EARN, the world Universities network; CDNNET, the Canadian X.400 network; ARPANET; CSNET; USENET; and other international connections.
- provides advising, consulting and documentation on:
  - command languages, including CMS and UNIX
  - high level languages, including FORTRAN, and PL/I
  - packages and libraries, including SAS, SPSS-X, BMDP, IMSL, and NAg
  - editors and formatters, including XEDIT, ed, nroff/troff
- provides general micro support
  - selection consulting for hardware and software
  - Micro Lab for evaluation of hardware and software
  - advice on University discounts
  - media conversion and data transfer
  - operates UTCS Microcomputer Bulletin Board System
  - offers Micro Laser Printing Service
  - offers 35mm slide production service using Polaroid Palette
  - administers Local Area Network of PCs for Education Facility
  - administers Macintosh Education Facility
- high quality typesetting
- installs and maintains application packages
- provides short courses and seminars on the more popular services and software packages

The principal mandate of UTCS is to plan, implement, and operate facilites and "common-carrier" networks, and to plan and support divisional, departmental or project computer facilities as requested.

Facilities Managed by UTCS

Administrative Computing

- administrative IMS/VS, DB/DC, DB2, Batch, and TS0
- 4381-R14 processor, 32 megabytes of memory
- MVS operating system

Computer Disciplines Facility/UNIX

VAX-11/780, 4 megabytes of memory (cdfa)
- Computer Science interactive access
- UNIX (Berkeley UNIX 4.3bsd)

SUN 3/280, 8 megabytes of memory (cdfb)
- Computer Science interactive access
- SUN UNIX 3.5

VAX-11/750, 4 megabytes of memory (cdfc)
- Computer Science interactive access
- UNIX (Berkeley UNIX 4.3bsd)

Computer Disciplines Facility/PC

- 97 TI Professional Computers connected in a Local Area Network
- introductory Computer Science instruction
- MS-DOS with Turing environment

Erindale College Systems

VAX 8200, 8 megabytes of memory
- instructional access using VMS
- research access

VAX-11/750, 5 megabytes of memory
- instructional access using UNIX (Berkeley UNIX 4.3BSD)

Institutional Relations System

VAX-11/750, 8 megabytes of memory
- database services to the owner departments using VMS

EPAS Facility

- 4361-5 processor, 16 megabytes of memory
- general VM/CMS services to the owner departments

Ontario Centre for Large Scale Computation (OCLSC)

- Cray Research Inc. X-MP/22
- 2 processors, 2 megawords main memory
- solid state disk (SSD) with 16 megawords of storage
- COS 1.16 operating system
- VAX-11/750 + microVAX II providing VMS front-end services directly and to VMS and UNIX nodes
- VM front-end services provided by UTCS 4381-R03

UTCS Software List

SOFTWARE LIST
for
MAINFRAME
COMPUTERS
VM/CMS, UNIX

Each programming language or package available at UTCS has a support level. In general, Class A Products receive full support, Class B limited support (as time and resources allow), Class C no active support.

For complete details of UTCS product support policy, see the UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction.

Package/Compiler	System	Support	Version
Communications			
Kermit	VM/CMS	A	---
	UNIX	B	4C(058)
FTS	VM/CMS	A	---
MAIL/MAILBOOK	VM/CMS	A	86.359
MICROLASER	VM/CMS	A	---
macget/macput	UNIX	C	---
netcopy, netexec, to (NetNorth Tools)	UNIX	B	---
xmodem	UNIX	C	---
ftp,rsh,rlogin,telnet,rep *(Access via TCP/IP to most of the networked machines on all three campuses)*	UNIX	B	---
rn/Pnews	UNIX	B	---
mail,mh,Mail	UNIX	-	---
rje	UNIX	B	---
Graphics			
PLOTBASIC (FORTRAN)	VM/CMS	C	---
SAS/GRAPH	VM/CMS	A	5.16
Languages			
ASSEMBLER(F)	VM/CMS	C	---
Concurrent Euclid	VM/CMS	C	1.9
FORTUTILS	VM/CMS	A	2.2
PL/I OPT Compiler	VM/CMS	B	1.5.1
REXX	VM/CMS	A	---
SNOBOL 4	VM/CMS	C	3.5
Turing	VM/CMS	C	---
VS FORTRAN	VM/CMS	A	1.4.1
VS Pascal	VM/CMS	C	2.2
Waterloo C	VM/CMS	C	1.3
WATFIV	VM/CMS	C	V2L0
WATFOR-77	VM/CMS	A	1.3
cc	UNIX	A	---
f77	UNIX	C	---
ratfor	UNIX	C	BSD std.
ttc	UNIX	C	---
pc	UNIX	C	BSD std.
yacc	UNIX	C	---
awk	UNIX	C	---
adb,dbx	UNIX	C	BSD std.
Numerical			
IMSL	VM/CMS	A	9.2
LINPACK	VM/CMS	C	---
NAg	VM/CMS	A	Mark 11
Statistical			
BMDP	VM/CMS	A	Level 85, Level 87
Minitab	VM/CMS	B	5.1
NAg	VM/CMS	A	Mark 11
NTSYS	VM/CMS	C	Dec. 1982
SAS	VM/CMS	A	5.16
SPSSˣ	VM/CMS	A	2.2
Text Processing			
SCRIBE	VM/CMS	C	4(1400)-1
Waterloo SCRIPT	VM/CMS	B	86.1
XEDIT	VM/CMS	A	---
8700 Pseudotypesetting	VM/CMS	C	n/a
MICROLASER	VM/CMS	A	---
ed	UNIX	A	---
vi	UNIX	C	---
cmacs	UNIX	C	---
spell	UNIX	C	---
diction/explain	UNIX	C	---
eqn	UNIX	B	---
tbl	UNIX	B	---
pic	UNIX	C	---
troff	UNIX	B	---
nroff	UNIX	B	---
TeX	UNIX	A	---

Software List continued

Package/Compiler	System	Support	Version
Utilities			
FORTUTILS	VM/CMS	A	2.2
TPRINT	VM/CMS	C	---
crypt	UNIX	A	BSD std.
compress	UNIX	C	BSD std.
csh	UNIX	B	BSD std.
diff	UNIX	A	BSD std.
grep	UNIX	A	BSD std.
ipr	UNIX	B	---
learn	UNIX	C	BSD std.
patch	UNIX	C	---
sed	UNIX	A	BSD std.
sort	UNIX	A	BSD std.
sh	UNIX	A	BSD std.
tar	UNIX	A	BSD std.
uniq	UNIX	A	BSD std.

Software List continued

SOFTWARE LIST for MICROCOMPUTERS

The following are microcomputer software packages for which UTCS can provide either support or some information. As with mainframe products, micro packages receive full support (Class A), limited support (Class B), or no active support (Class C). The specific criteria differ from those for mainframe classes and are outlined in the Academic's Guide to Microcomputer Systems.

Package/Compiler	Support	Version
Communications		
Kermit (MS-DOS)	A	2.27d
Kermit (APPLE II)	B	---
Kermit (CP/M)	C	---
Kermit (Macintosh)	B	0.8(35)
MacTerminal	B	---
PC TALK3	C	---
PC PLOT III	C	---
ProComm	A	TU 2.4.2
TOPS (PC)	B	2.0
TOPS IMacintosh)	B	2.0
WYLBUR/PC	C	---
Database Managers		
4th Dimension	B	Int. 1.03
AskSam	C	3.0
Clipper	B	---
DATAEASE	B	---
dBASE II (CP/M)	B	---
dBASE II (MS-DOS)	C	--
dBASE III (MS-DOS)	A	1.1
dBASE III Plus	A	1.1
FoxBASE	C	2.14u
Notebook II	B	2.03
REFLEX	B	---
ViewFinder III	B	---
ZyINDEX	B	---
Desktop Publishing		
PageMaker (Macintosh)	A	2.0a
PageMaker (IBM PC)	A	1.0a
Ventura (IBM PC)	B	1.1
XPress (Macintosh)	C	1.0
Graphics		
Aldus Freehand	C	1.0
Cricket Draft	C	1.2
Cricket Draw	C	1.1
DR HALO	C	---
Freelance Plus	B	2.0
Generic CADD	C	3.0
MiniCad	C	4.05
Illustrator	B	1.0
Image Studio	B	1.0
Lotus 1-2-3	B	---
Microsoft CHART (Macintosh)	C	---
MacDraw	A	---
MacPaint	A	---
35mm Express	B	---
Publish Pac (IBM)	B	---
Publish Pac (Macintosh)	B	2.0
Text Pac (IBM)	B	2.0
WATCOM GKS	B	---
Windows Draw	C	---
Languages		
BASIC	A	---
Microsoft FORTRAN	C	---
TURBO Pascal	B	---
WATFOR-77	A	---
Operating Systems, Utilities		
APPLE Turnover	A	---
CP/M	B	---
FASTBACK	B	---
Finder (Macintosh)	A	5.5
Hypercard (Macintosh)	A	1.01
IBM OS/2	B	1.0
Norton Utilities	A	4.0
PC-DOS	A	3.2

Software List continued

Package/Compiler	Support	Version
Sidekick	B	---
SuperKey	C	---
System (Macintosh)	A	4.1
TURBO Lightning	C	---
XenoDisk	A	1.41
Scientific		
Eureka	C	---
GAUSS	C	---
NathCAD	C	2.0
Spreadsheet		
APPLEWORKS	C	---
HAL	B	---
Lotus 1-2-3	B	2.01
Microsoft Excel (PC)	C	---
Multiplan (Macintosh)	C	---
Sound		
SoundWave (Macintosh)	B	1.0
Statistical		
Minitab	C	---
PowerStat	C	1.04
SAS/PC	A	6.02
SPSS/PC +	A	---
STATPRO	C	2.0c
Statview (Macintosh)	C	1.0
Word Processing		
FinalWord II	B	2.0
MacWrite	C	---
Manuscript	C	---
Microsoft Word (Macintosh)	A	3.01
Microsoft Word (MS-DOS)	A	4.0
Nota Bene	B	3.0
T^3	C	---
PC-TeX	C	---
Volkswriter Scientific	C	---
WordPerfect (MS-DOS)	A	4.1; 4.2
WordPerfect (Macintosh)	C	1.0
WordStar	B	---

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